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The American Livestock and Meat Industry

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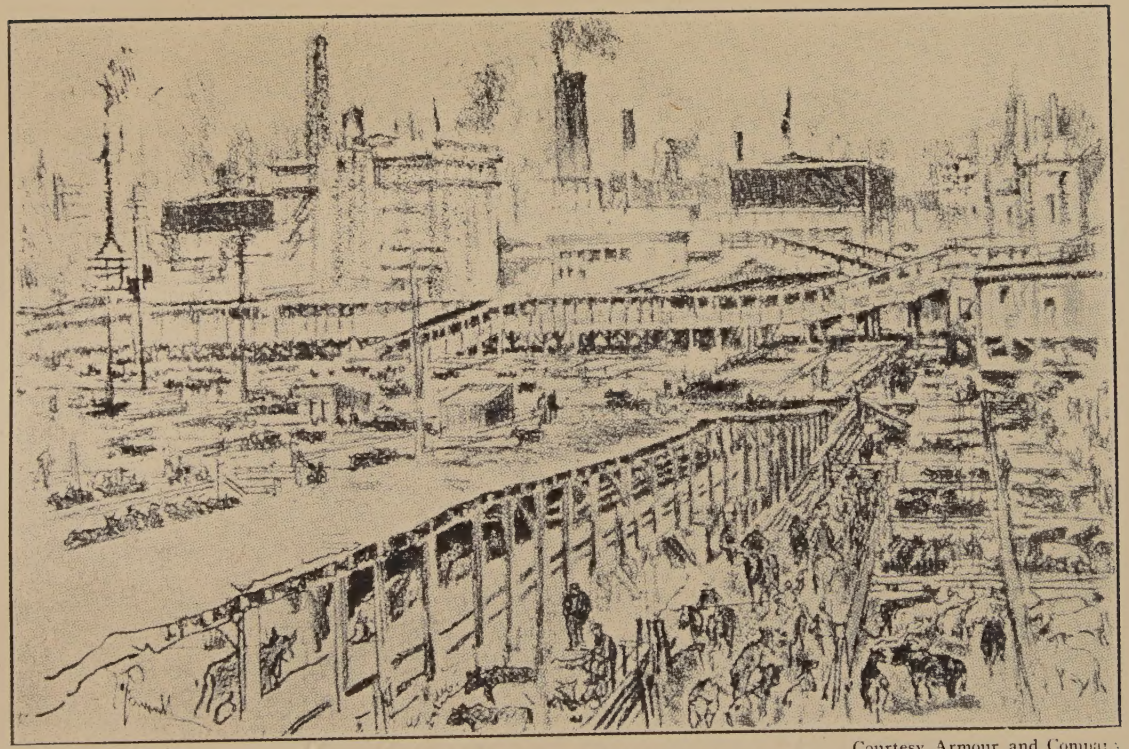

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The Heart of a Great Industry—An Impression

From an original sketch by Joseph Pennell

THE AMERICAN LIVESTOCK AND MEAT INDUSTRY

By

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This is an abridged reprint. The portion excluded from this volume deals with problems of marketing and public regulation in the 1910's which are of minor historical interest.

History of American Economy: Studies and Materials for Study

A series of reprints of the important studies and source books relating to the growth of the American economic system.

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TO

THOMAS FRANKLIN HOLGATE

DEAN EMERITUS OF NORTHWESTERN UNIVERSITY

SCHOLAR AND UNIVERSITY ADMINISTRATOR

COUNSELLOR AND FRIEND OF YOUTH

702099 WITHDRAWN

PREFACE

In this book is presented for the first time a comprehensive account of the largest industry in the United States and a statement of its fundamental significance in the life of the nation. The production and marketing of livestock alone engages the attention of what is perhaps the most substantial portion of our agricultural population. The packing and curing of meats; the distribution of fresh meats on a national and international scale, by packers, wholesalers, and retailers; the manufacture of by-products of so wide a variety that they enter in some form into the daily use of practically the entire population—these activities with those of actual livestock production employ one in six of the workers of the country. The story of the origin and development of this vast and many-sided group of industries from colonial times to the present is dramatic in the extreme. A clear view of their place in our economic life today and their relation to the public welfare is of the greatest importance.

With so wide a field to cover, the utmost economy of space in treatment has been necessary. The aim in this volume has been to cover broadly and in proper perspective all the main lines of the complex subject, and especially to bring out those important aspects which are less known to the outside public. Accordingly, so far as particular topics have already received adequate treatment in published works the reader has been referred to these for discussion of details. Practically all of the material here presented is published now for the first time.

The gathering and analysis of this material, in the absence of any organized literature on the industry, has extended over a number of years. It has involved much travel; extensive personal investigation; and the examination of a great array

of documents, of the files of many business and agricultural periodicals, and of the data contained in several scholarly studies as yet in manuscript form to which I have most generously been given access by the authors. That the investigation has been carried through at all is owing in very large measure to the advice and cordial co-operation of many organizations and personal friends.

I am especially indebted to the following: the United States Department of Agriculture, particularly the Bureaus of Agricultural Economics and Animal Industry, the Federal Trade Commission, the Institute of American Meat Packers, Paul I. Aldrich, editor *The National Provisioner*, Professor James Westfall Thompson of the University of Chicago, Dr. L. D. H. Weld, Dr. R. J. H. DeLoach, Messrs. John Clay, Edward N. Wentworth, C. L. Harlan, Clytus A. Freeman, and Victor A. Newman.

In the preparation of the bibliography Mrs. Ethel Wight Usher of the John Crerar Library, Chicago, and Mrs. S. K. Maddux aided greatly, and the index is the work of Mr. David M. Matteson, Cambridge, Massachusetts. For assistance in reading the proofs I am indebted to Mr. O. C. E. Matthies. For the opinions expressed throughout the volume, I am, of course, alone responsible.

RUDOLF A. CLEMEN.

University Club of Evanston,
Evanston, Illinois,
April 2, 1923.

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The American Livestock and Meat Industry

INTRODUCTION

Meat Industry Beginnings

Meat packing in the United States began in colonial times with the farmer-packers who "packed," that is, cured and smoked, meat for local use during the winter time. About the year 1640 the civil war in England, which kept English traders at home and restricted their markets, enabled the colonists to take over the supplying of the West Indies with livestock, barreled beef and pork, bacon, and hams. The first American packer giving his whole time to the business was William Pynchon of Springfield, Massachusetts. The name "packer" has been used since that time, although "packing" comprises today a relatively small part of the meat industry. Before 1870, meat was dried and smoked and shipped in barrels or in bulk, and later was pickled for the "plantation trade" and seagoing vessels when dried or smoked meats would not do for these consumers. Today most of the livestock slaughtered is shipped as dressed meat in refrigerator cars.

After the War of Independence there came a new era in our agricultural history, one of the most important features of which was the agrarian migration and the shifting of the center of livestock raising to the Ohio Valley. This made possible, indeed made necessary, the rise of an organized industry of meat packing with its headquarters at Cincinnati, for meat packing follows livestock.

In 1794 two events greatly stimulated settlement in Ohio and also encouraged cattle and hog raising. The first was the elimination of the Indian menace after the Battle of Fallen Timbers. The second was the Whiskey Rebellion, the establishment of an internal revenue system and the placing of an

excise on whiskey. When the farmer lost the right to convert corn into whiskey he turned his attention to the raising of cattle and hogs.

Cincinnati the Meat Center

The first regular packer in the West was Elisha Mills, a "downeaster" who began in Cincinnati in 1818. Small packinghouses grew up in many of the river towns in this middle west region, but from 1830 to 1865 Cincinnati was the most important center for the business, and in 1840 had been labeled "Porkopolis." Cincinnati was already known as the "Queen City of the West." It had a strategical position on the Ohio River, the center of a great fertile territory. It was a steamboat building center and a natural port on the main lines of communication which were then north and south. The remarkable growth of Cincinnati, however, came with the development of a second advantage in the form of superior transportation facilities radiating from it which made possible the concentration and marketing in that one city of the livestock of the region.

From that time until the Civil War, Cincinnati had a monopoly control both east and west. It had a choice of markets. Further, Cincinnati had superior banking facilities and the packing industry even then demanded large sums to be paid in ready cash.

Between 1830 and 1860 it was first recognized—as Professor James Westfall Thompson has pointed out—that there is a definite belt or zone of territory lying between the 36th and 43rd parallels and extending west to the 100th meridian, which may be called the "American Beef Belt." It was found that the cattle pastured there fattened in less time and mixed their lean and fat more fully and evenly than cattle fattened elsewhere. North of this zone the intense cold caused unprofitable consumption of provender necessary to preserve the required amount of animal heat and the beef was of poor quality,

dark in color and with inadequate mixture of fat and lean. South of this zone beef became stringy and fat because tallow was not interlarded with the flesh.

Central Cash Livestock Markets

Out of the above situation there developed the great centralized cash livestock markets of the Middle West which have been a fundamental factor in locating the meat packing industry on a large scale in that region.

For a long time great droves of surplus livestock had been driven on foot from the Beef Belt over the mountains to eastern markets by professional drovers. These cattle markets and the cattle fairs of the Middle West, like those in Bourbon County, Kentucky, and Madison County, Ohio, were picturesque. After a time the fairs declined in importance, partly because of want of energy and system, and partly because the growth of population in certain centers and the development of transportation necessitated large-scale markets. As cities like Cincinnati and Chicago became great collecting points for the business of droving, we find the packing industry developing there.

The tendency toward concentration of livestock for the supplying of the eastern markets was greatly accelerated by the railroad building of the fifties. This railroad construction meant connecting East and West as cheaply and readily as West and South. The most important of the new trunk lines were the New York Central, Pennsylvania, and Baltimore and Chesapeake Bay.

Although large numbers of livestock were collected at Cincinnati, St. Louis, and Chicago, there was for years no necessity felt for the combination of conveniences known as "stockyards." But as time went on drovers wished for a place to keep their stock awaiting sale. In Chicago several yards were laid out, the earliest being the Bull's Head Market in 1848. During the Civil War, when an enormous increase

in production of hogs and cattle took place, the existing yards were found to be too small; dealers, shippers, packers, and railroads were greatly inconvenienced. Buyers and sellers had to be brought together. So on Christmas Day, 1865, the Chicago Union Stock Yards were opened.

Livestock Commission Men

A few years previously the most important factor in cash livestock markets had emerged. This was the livestock commission firm, the earliest of which began business in Chicago in 1857. The practical advantages connected with the commission firms were at once apparent. The commission man was always in the market and knew what stock was worth. To increase his commissions it was to his interest to get the highest prices possible. It was desirable that he be a man of integrity. Previously the sale of livestock had been on a credit basis, often resulting in loss. Now the drover could ship his cattle to a market and draw on the commission man for the money as soon as the livestock was delivered. Evidence of the advantages of this factor appears in the fact that as soon as the system began to work a great many men went into the business of shipping livestock east to markets to meet the demand. Thus by the end of the Civil War the essential factors of the modern American centralized cash market were present—stockyards, livestock commission firms, and meat packing companies.

Causes of Modern Meat Industry

It is one of the most remarkable coincidences in economic history that in the years 1870–1875 there should come to the front in response to an economic necessity, the four factors whose combination was essential for the development of the meat industry of today. These factors were, first, the opening and developing of a new source of supply of livestock; second, the extension of railroad transportation to the source

of supply; third, refrigeration; fourth, men to organize the distribution of livestock and meat in the most efficient way.

In 1865 a government report by Dr. Loomis presented the first careful study of the distribution of livestock in the

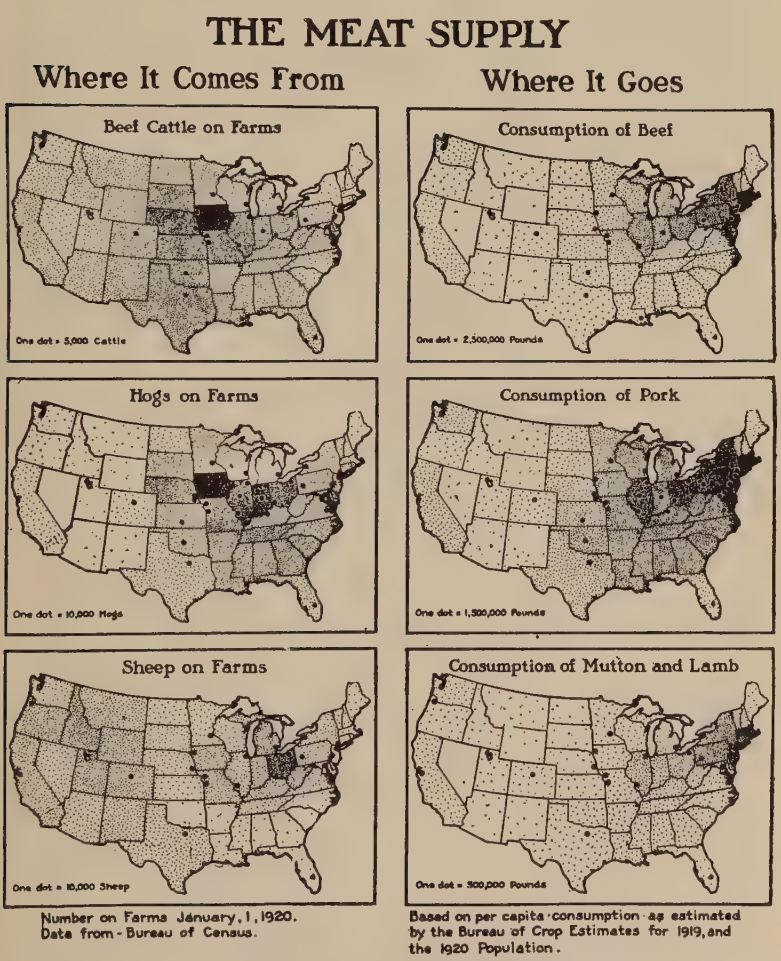
THE MEAT SUPPLY
Where It Comes From
Where It Goes
Beef Cattle on Farms
One dot = 5,000 Cattle
Consumption of Beef
One dot = 2,500,000 Pounds
Hogs on Farms
One dot = 10,000 Hogs
Consumption of Pork
One dot = 1,300,000 Pounds
Sheep on Farms
One dot = 10,000 Sheep
Consumption of Mutton and Lamb
One dot = 300,000 Pounds
Number on Farms January, 1, 1920.
Data from - Bureau of Census.
Based on per capita consumption as estimated by the Bureau of Crop Estimates for 1919, and the 1920 Population.
Large dots show the location of Principal Slaughtering Centers.
Courtesy Commercial Research Department, Swift and Company.

Figure 1. Maps Showing the Geography of Meat Production and Consumption

United States. It showed the dependence of East upon West for meat. It also showed the necessity of increasing the beef production. By that time, however, Texas, which had developed a cattle industry, was becoming overstocked and after the Civil War began to send its surplus north. From that situation came the beginning of cattle driving on the great trails to shipping points from which the livestock could be sent east. Very shortly after came the establishing of the great cattle ranges of the Far West over which has been thrown the glamor of song and story. By 1885 the heyday of the ranges was past and they gave way to the ranch farm.

As the ranges increased there was a constant urge westward on the part of the railroads which soon slashed in every direction the states between the ranges and the American Beef Belt. Though at first skeptical of the cattle trade, the roads soon encouraged it markedly by a system of rebates and freight wars over the transportation of livestock east.

Meat Trade Revolutionized by Refrigeration

Such was the situation when inventions in refrigeration made it possible to pack meats all the year round and to do away with the long haul of livestock. Refrigeration made it possible to utilize to the fullest extent the supply of livestock and it made the distribution system of meats nation-wide and world-wide. It prevented the decay of perishable products. As it lengthened the period of consumption it led to greatly increased production. It enabled the owner to market his product at will. Finally, it made possible the transportation of fresh dressed meat in good condition from points of production to points of consumption. These aims were realized in the early seventies and were of fundamental importance.

The great problem which then faced the meat industry was how to apply refrigeration to transportation. Attempts to build refrigerator cars had already been made in the late sixties and early seventies. Some shipments, indeed, had

been sent to Boston with fair success. But up to 1875 no great progress had been made.

The Packers

At this point the new packers appear. Up to 1875 packers had been pork packers. From that time on in the development of the beef trade the packers with a national market were those who knew cattle dealing and either had been cattle dealers, or had acquired the knowledge subsequent to developing a pork packing business. Of these new packers the names that come to the public mind most readily, though they are not by any means the only ones, are Hammond, Morris, Armour, Swift, and Kingan, who have been called the builders of the modern meat packing industry and whose biographies are stirring romances of American business. It was the work of these men with the refrigerator car which revolutionized the meat industry, created the dressed beef traffic on a commercial basis, and organized the distribution system of the modern meat industry. In this task they showed courage seldom equaled in commercial history.

The Dressed Beef Trade

The experience of one of these men shows with what extraordinary rapidity the new dressed beef trade grew, for G. F. Swift, a Yankee from Cape Cod, typifies this development. Swift, like his contemporaries in introducing dressed beef into national commerce, was a careful student of business problems. He had had good training in cattle trading and had seen the necessity for reform in the slaughtering and butcher business. The methods of slaughtering followed everywhere by the local butchers, who then dominated the situation, were a menace to public health. While Swift was a cattle dealer in Brighton, Massachusetts, in 1870–1873 he had seen the State Board of Health force concentration of slaughtering under regulation with success.

In 1875 G. F. Swift went to Chicago, the same year, as it chanced, that his great rival, P. D. Armour, moved to Chicago from Milwaukee. Swift soon saw, as did Hammond, Armour, and a few others, the possibilities of concentrating slaughtering in a few large centers and shipping dressed beef in refrigerator cars. In attacking this problem Swift was instrumental in discovering some of the fundamental principles of refrigeration for railroad freight cars.

Winning of National Market

Swift was in a logical position to introduce dressed beef into the markets of the East. He was well known in New England, whence he had come, and he had brothers on the spot to aid him. Again, his method was a shrewd one, for he allied himself in partnership with the leading slaughterers in the various towns, persons of importance who had a clientele, a successful meat trade, and capital. These partnerships lasted well into the nineties.

The fight to get dressed beef into the markets of the country continued for over a decade and was extremely bitter. First, the consuming public was prejudiced against it. Second, the railroads did not like the new business. And third, the local butchers throughout the country fought it in all possible ways —by boycott, press propaganda, and legislation.

By the time the dressed beef trade had become a permanent business the meat packing industry had established, in the main outline at least, its remarkable distribution system of branch houses and car routes, a system which merits careful study. Moreover, the development of the system in the United States soon led to the development of an export meat trade which has attained great proportions.

Federal Meat Inspection

The dressed beef traffic brought in its train two factors of great and lasting benefit. The first in importance was the

inauguration of the Federal Meat Inspection Service, putting the slaughtering of livestock and preparation of meat for interstate commerce under the best inspection system in the world. The principal packers themselves urged such federal inspection previous to 1890, when the first act was passed, and again in 1906. The efficiency and honesty of the system have been attacked in years past, but its high standard is unquestioned today.

The other economic benefit that grew out of the dressed beef trade has been the introduction of chemical control in the packing industry. Today the amount realized for the dressed beef is normally much less than the purchase price of the live animal. Chemistry has made that possible through the development of a great number of by-products. There are now, because of large-scale plants, the analytical chemist, the research chemist, the chemical engineer, and the business or commercial chemist. Chemical control has also made it possible to set and maintain definite standards of quality.

Such is the American system of large-scale meat packing, whose development has resulted logically from economic necessity. The meat industry, whose rise has been sketched in outline here and which will be treated in detail in this book, has been recently the subject of widespread interest and discussion, both in Congress and outside. This public interest and controversy resulted after several years in the dramatic dénouement of government regulation through the enactment of the Packers' and Stockyards Act of 1921.

Modern Problems in Meat Packing

The meat industry at the present time presents four problems which are considered in this work. One is internal and the other three are of an external or public nature. One is concerned with the actual physical operation of the ordinary packing business unit at a profit. That is a business proposition. The other three problems have a wider social signifi-

cance and deal with the relations of the packing industry to other industries, to the government, and to the public.

The actual technical manufacturing processes of the meat packing industry are so highly complicated and so manifold in number that they cannot properly be taken up in a work dealing with the general economic development of the industry. They may be found in a recent authoritative book on the subject, entitled "The Packers' Encyclopedia." On the other hand, the methods of analyzing the various costs entering into the actual operations of a packing plant are of economic importance and fundamental in understanding the meat business. This subject therefore is treated in the present work under the title of "cost accounting."

The external problems of the packing industry—the problem of marketing livestock, the problem of labor, and the question of monopoly—are treated in this book in the order just given.

Livestock Grades and Classes

The grades and classes of livestock, cattle, hogs, and sheep are many and various, as can be seen from the quotations of prices at public stockyards day by day. Some of these grades are more desired by packers as raw material than others. It has been difficult to get a standard uniform classification because buyers themselves often disagree, for a good deal depends upon the receipts and on individual opinion. Recently, however, attempts have been made both by packers and by the United States Bureau of Agricultural Economics to develop a classification that shall be considered standard, an effort which represents definitely a step forward. Both of these tentative classifications are given in this work.

Closely bound up with the actual production of livestock and the types, grades, and classes, is the method of financing the production of livestock. This has had an interesting development. Indirectly it is of great importance to the pack-

ing industry. There has been gradually evolved in this country a highly articulated system of agricultural finance or agricultural credit. For livestock there are cattle loan companies and other private agencies, some of which aid livestock production in a very real but indirect way. Since 1900 much progress has been made, and as a result of war conditions there has been worked out by government agencies, such as the War Finance Corporation, joint-stock land banks, and other institutions, a national agricultural credit system regarding which there is as yet little systematized information.

Methods of Marketing

After livestock have been produced and brought to maturity through adequate financing they have to be marketed. The present methods of marketing are an evolution from the cruder methods of earlier times. They throw a profoundly interesting light upon the economic life of the nation, for the stockyards today are a throat or channel through which the meat supply of the nation has to pass on its way to the consumer. In general the functions of central livestock markets include:

1. Providing great cash markets where livestock can be bought and sold.
2. Providing facilities for the handling, care, feeding, weighing, buying, and selling of livestock and the financing of sales.
3. Enforcing rules of purchase and sale through highly organized livestock exchanges.
4. Providing facilities for the collection of information as to the supply, demand, and other considerations influencing the trade.
5. Aiding in the quotation of prices of livestock.
6. Serving as central points from which livestock may be conveniently shipped to stockmen, feeders, eastern buyers, and foreign markets.
7. Acting as final markets for some 70 per cent of the entire receipts.

8. Concentrating large numbers of animals at a few places and facilitating the federal and state inspection of livestock and meats.

Defects in Present System

As a basis for intelligent modification of the marketing system, to remedy these defects, a study of seasonal movements or cycles, analyzing the livestock supply which is marketed and the whole structure of price is most important. A knowledge of these cycles is the basis on which the plans for modifying the present marketing system must be built. And it is clear that it would be desirable to modify it in some ways, for the defects are of a nature which indicates of itself the desirability of a remedy.

These defects in the present livestock marketing system can be summarized as follows:

1. Marketing takes place in almost complete ignorance of the supplies to be marketed.
2. No permanent organized attempt has been made to accommodate supplies of livestock to consumptive demand for meats.
3. There is no permanent method by which temporarily excessive receipts can be checked by concentrated efforts of shippers.
4. Faulty distribution within each week makes efficient handling very difficult.

Attempted Solutions of Marketing Problems

Wartime emergency brought temporary attempts to solve the problem of marketing livestock by more orderly methods. The first of these was known as the "zoning" system, in relation to central markets. From some zones livestock could be shipped on certain days of the week and from other zones on remaining days. This device was intended to stabilize market receipts and prices by establishing a five-day market instead of the present two-day market. A second device was the "hog

price control" plan which was put into effect by means of an agreement between producers, packers, and the United States Food Administration.

The success of these plans, temporary as it proved to be, was due in part to the great purchasing power of the Food Administration, but in greater measure to the new element of co-operation between the different interests concerned, which had been developing for several years and which resulted in various conferences on a nation-wide scale. This co-operative livestock marketing movement seems likely to bring a permanent organization of agricultural interests for the bettering of marketing methods. Its ideas are put into effect by a central body known as the National Livestock Producers' Association, which directs the work in a general way. The actual co-operative marketing is handled by co-operative livestock shipping associations and commission associations of livestock producers. The future seems to lie with some form of co-operation, but probably success will rest with a form of co-operation that includes all factors in the industry. And of these factors meat packers form one.

Labor in the Meat Industry

The second problem of great social importance in the present packing industry is that of labor. The phenomenal division of labor in modern American industry is shown at its maximum in meat packing. The development of this feature, the different races that have come into the industry at centers like Chicago, the rise of trade unions among them, and the great strikes culminating with that of 1904, make an interesting story. But of more constructive significance is the period since 1904, when the packers began to humanize the industry, to better the conditions and hours of work. Welfare departments, gymnasiums, medical and dental service, cafeterias, libraries, pensions, benefit associations, and a system of employee representation in plant assemblies whereby the work-

ers and management work out the conditions of labor—all these have been established in order to make the lot of the worker easier and to stimulate greater co-operation between management and labor in the success of the whole institution.

The Question of Monopoly

The question of monopoly in the packing industry is one which has attracted a great deal of public attention. Stretching over a period of thirty years there have been three major federal investigations. There have been also judicial cases, the conclusive one of which in 1912 resulted in a verdict of "not guilty."

The monopoly charge itself has been based in great measure on the fact that the percentage of livestock receipts purchased by each of the larger packers remains approximately constant from year to year. This is explained by the fact that each company is continually endeavoring to increase its percentage, but is met by the competition of the other packers. Constant competition means that it is difficult for any single packer to increase his percentage to an appreciable extent.

The final investigation was carried on by the Federal Trade Commission which began its work in 1917. The investigation resulted in a report in which the five larger packers were charged with the maintenance of a monopoly based upon secret agreements for division of livestock purchases and collusion in the sale of meat and meat production. At the time the report was written there was a great wave of sentiment in favor of government ownership, and government ownership was in fact recommended by the Commission. But this policy was not adopted by Congress.

While the charges made by the Trade Commission were refuted, the larger packers realized that public opinion was so stirred that some concession ought to be made to it, especially since the effect of the report at home and abroad upon the meat

business had been distinctly bad. This determination had its outcome in the so-called "consent decree," which was a voluntary agreement on the part of the larger packers to dispose of their interests in public stockyards, stockyard terminals and railroads, market papers, cold storage warehouses, and to give up the sale of "unrelated lines" and the use of their distribution system for other than meat products.

Government Regulation of Meat Packing

In the meantime a succession of bills for regulating the packing industry was introduced into Congress and finally the Packers' and Stockyards Act of 1921 was passed. By this act the regulation of the industry is entrusted to the Secretary of Agriculture, who delegates it to an assistant in charge of the Packers' and Stockyards Administration, and provision is made for investigation and for penalty in case of violation of orders of the Secretary—and also for appeal. While the act seemed to make friction almost unavoidable, the first year's record was one of constructive co-operation and—what is more —of progress.

Co-operation and the Future

At the present time the industry enjoys a unique position as the largest in value of product in the United States. The chief feature to be noted as a result of its rapid expansion over the whole country is the development of co-operation; first, among packers; second, with producers; and third, with meat retailers. The entire meat industry in this way has been unified for more effective work. The increase in efficiency has been facilitated by the establishment three years ago of the Institute of American Meat Packers with headquarters at Chicago, an outgrowth of the earlier American Meat Packers' Association organized in 1906. Its influence on the future development of the meat industry will be great, for it will under a recently adopted plan become a combination of trade associa-

tion, industrial museum, research institute, and educational institution. It represents the organization of the meat industry on a scale and with a vision which shows an amazing development in the space of a single generation.

PART I

THE PRE-REFRIGERATION PERIOD

CHAPTER I

EARLY AMERICAN LIVESTOCK AND MEAT INDUSTRY

Development of Livestock Industry

The meat packing industry from its very nature must always be most closely associated with the livestock industry, since it relies on the latter for its raw material. Throughout its entire history its organization and location have depended upon the distribution and spread of the livestock of the country. With the development and westward trend of American livestock following the frontier settlements we have a similar movement of the American meat packing industry. It is necessary to review the progress of livestock for an understanding of meat packing.

New England

The colonists who settled in Massachusetts took care to be supplied with cattle, though it was no easy thing for the people in England to send such cattle on the small ships of the period. These first cattle were imported in 1624 by Governor Edward Winslow and came from Devon and adjoining counties. Each year more cattle were brought, mostly for the "Governor and Company of Massachusetts Bay in New England," and by 1632 the cattle stringency of the New England counties was somewhat relieved. This was in spite of the losses caused by the Indians and wolves which sent the price of cows in 1636 from £25 to £30 each.[1] It was in order to find pasturage for

[1] Executive Document, 1854, Vol. 7, p. 2.

their cattle that the settlers scattered widely and founded so many new towns, as, for example, Concord.[2]

The breed of the cattle was improved by the action of Captain John Mason in introducing into New Hampshire some large yellow cattle from Denmark. In 1638, 100 of these new oxen were driven to Boston and sold for £25 a head.

It was the idea of bettering their condition and that of their livestock that led William Pynchon and others to remove from Roxbury and establish a new settlement on the Connecticut, but within Massachusetts, at a place later called Springfield.[3] The same year, 1636, 260 cattle were driven from Newton, Massachusetts, to Hartford, Connecticut, by emigrants who founded that town. A little later New Haven and Windsor and other places were settled. And after fifteen years of labor the colonists in New England were fairly well provided with cattle and hogs, though few references to hogs are to be found in the records.[4]

It was, however, quite different with sheep. Their failure to increase rapidly and the ravages from wolves, the climate, together with lack of care on the part of the colonists, made it difficult to keep them from utter extinction.

First American Meat Trade

It has been pointed out that just as New England had entered upon prosperity, it was profoundly disturbed by the outbreak of the Puritan Revolt in England against Charles I and the Civil War which followed. These events kept Englishmen from coming to America and the English markets for goods fell away. Hard times reached their lowest ebb in 1641 with a drop in cattle values similar in its effect to a modern panic.

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[2] Thompson, J. W., A History of Stock Raising in America from Earliest Colonial Times to the Present (1607–1916). (Unpublished.) Chap. II, p. 7.

[3] Barber, History Coll., p. 291.

[4] "There are not many Towns in the country," records Johnson in "Wonder-Working Providence," Bk. I, Chap. XXI, "but the poorest person in them hath a house and land of his own and bread of his own growing, if not some cattell: besides flesh is now no rare food, beef, pork and mutton being frequent in many houses."

The significance of this event is that the hard times stimulated enterprise. England and Ireland no longer supplied the British West Indies with cattle and sheep as formerly, while the planters themselves gave all their attention to staple tropical products. All livestock, wool, and barreled beef, pork, bacon, and hams required for the planters and their slaves had been imported. With the failure of England and Ireland to continue supplying the islands, the farmers of New England set out to capture this trade.

And in this commerce Massachusetts and Rhode Island grew rich. Winthrop wrote: "Now the country doth send great store of biscott, flour, peas, beef, porke, butter and other provisions to the supply of Barbadoes, Newfoundland and other places." Virginia and Maryland also supplied a market for these products. Writers stated that the other American plantations could not well subsist without New England. In this way there was given the first impetus to the development of a meat industry in the colonies.

First American Packer

The natural richness of the Connecticut River Valley drew settlers into western Massachusetts where Springfield, Hadley, and Hatfield were founded. In the second half of the seventeenth century this region became famous for stock raising. And here lived the first American packer in William Pynchon of Springfield. In the autumn preceding 1655 he began as a drover, taking cattle from Springfield to Boston, and by 1670 he was sending winter-fattened cattle. Indeed, stall feeding may be said to have originated with the farmers of Springfield and Hadley.

Pynchon, however, did more than fatten live cattle for the Boston market. He also dealt in mutton tallow and wool,[5] but his chief business was pork packing. Between 1662 and 1683 he bought and packed great numbers of hogs, presumably

[5] Judd, Hadley, p. 372. He bought sheep in Rhode Island in 1655.

in the main for the West Indian trade. Pynchon's records give some information as to the swine in colonial New England. Most of them were black or sandy in color and of no choice breed. They were "razor-backs," wild speedy runners ranging the woods in a wild state. They were also able to fight off the wolves. According to Pynchon it does not seem to have been the custom to fatten at all before killing, which was probably due to the prevailing scarcity of corn.

Prices Paid

It was usual for Pynchon to pay the farmers for their hogs 2½*d.* to 3*d.* per pound in "country pay." The weight of several typical lots of hogs are given in his records. One lot of 162 hogs weighed 27,409 pounds, averaging 170 pounds per animal. Sixteen weighed less than 120 pounds; 25 weighed over 200 pounds, and two ran up to 270 and 282 pounds respectively.

Cured pork at that time was higher in price than cured beef and was generally a better article. In 1685 the Saco minister got beef at 1½*d.* and pork at 2½*d.* per pound. Pork and beef were often named in the Connecticut and Rhode Island rates as receivable for taxes. At that time pork sold from 50*s.* to 70*s.* per barrel, the latter being in those days a high figure.[6]

A difficulty the colonists were confronted with was the habit the Indians developed of stealing and killing cattle and hogs. Sometimes they would even bring the pork to town for sale. Concord tried to solve the problem by enacting a law that "all swine owned by Englishmen should be marked on their ears, but that the Indians should not mark their swine, and when the latter came to peddle pork they were to bring the ears of the slaughtered hog along as proof of ownership, or else the meat was forfeited."

[6] A barrel of pork in 1671 exchanged for 300 pounds of sugar in Barbadoes. (Weeden, Vol. I, p. 333.)

Farmer-Packers

With the danger of the Indians gone after King Philip's War (1675–1676), new localities were settled and among them the Merrimac Valley, which soon became as important a cattle raising country as the Connecticut. In both places, especially around Hadley, as new grazing towns were settled, a brisk business was done in barreling beef and pork. William Pynchon's career as a packer had ended in 1683, but after him came numerous successors in the business. Towards the end of the century Worcester, Massachusetts, had excellent meat cattle and a good beef and pork trade.[7] At the same time it must be noted that most of the cured meats were prepared by the individual farmers who killed their own stock for local use. An example of these farmer-packers who were also cattle traders was a Mr. Lewis of Farmington, Connecticut. Later during the Revolution he was chiefly concerned with slaughtering and salting cattle to be sent to Fishkill from the state of Connecticut.[8]

It was a custom for the farmers to have what they called "the killing time," slaughtering at that season a bullock or two, with several hogs and perhaps a few sheep, which had been fattened expressly for the family's provisions during the ensuing year. This generally took place late in the fall or sometimes as late as Christmas. The barn floor was used, with tackle fastened to the stout beams and the animals were hoisted and dressed. A rough framework was erected and the hogs as a rule were dressed near their pens where hot water was easily procured.

In towns like Salem there sprang up naturally a demand for beef. Several large slaughter houses were erected to care for this business, but in spite of this improved system trouble arose and complaints were made. For example, it was urged that the citizens of Boston were obtaining their meat direct

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[7] Dwight, Travels, Vol. I, pp. 374–376.
[8] Chastellaux, Travels, p. 32.

from the outlying country districts instead of through the local Boston butchers and slaughter houses. As a remedy for this the butchers of the town formed a guild to supply meat at a price named by the selectmen.

Cattle and Hogs

As years went by the New England colonies could not compete with Virginia and the Carolinas in supplying the West Indies with live beef cattle and pork products. Much of the barreled meats not destined for strictly local use were consumed by the fishing fleets. But cattle continued to be generally raised in New England, chiefly for local needs. Most of the cattle trade centered in Boston. From 1753 to 1757 William Clark of Northampton regularly drove cattle to Boston and Cambridge. His account book shows the small size of cattle at that time, the average of twelve oxen being only 767 pounds. As to prices they ranged from 16*s.* to 20*s.* per hundredweight. An exception to the usual run was a steer five years old whose weight was 2,270 pounds, which with another furnished a dinner for General Washington and all the officers of the army at Valley Forge.

There was a marked difference between the condition affecting the hog and cattle markets. The author of "American Husbandry" (1775) states that "hogs are throughout the province in great plenty and very large, a considerable export from the province constantly goes on in barreled pork."[9]

Boston Meat Market

While the early markets for livestock and meats in colonial New England followed the custom of Old England, the open market law was never introduced. Nevertheless, the holding

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[9] American Husbandry, pp. 80–81.
The center of pork-packing and barreled beef extended beyond the Springfield region though on a smaller scale. Timothy Dwight of Northampton once packed 50 hogs which averaged 201 pounds; Deacon Hunt of the same place killed a hog in 1774 that weighed 335 pounds—the first New England hog of record to weigh over 300 pounds. (Judd, p. 371.)

of a market or a fair was in some instances made a condition of a charter or privilege, as, for example, at Newcastle, New Hampshire, in 1693.

Boston became the greatest center, but was tardy in setting aside a place for a market. In 1633 the spot where the old State House stands was made the market place by an order of the Court of Assistants. Other towns like Dorchester, Charlestown, Salem, and Lynn soon applied for privileges of a market town. By 1696 market was held on Tuesday, Thursday, and Saturday of each week, the ringing of a bell announcing the opening and closing hour. The country people, however, complained that this custom of special days worked to the advantage of the townspeople, since it caused a glut of provisions, with the result that in 1734 the market was open every day. In this market there were no middlemen. The farmers came and sold their own produce for West Indian articles and they also did some itinerant marketing.

It was not until 1742 that the old-fashioned ways came to an end with the erection of Faneuil Hall where buyers and sellers might meet. Regulations were then voted regarding the quality of meats sold and as a result both the producer and the consumer were greatly aided.[10]

Such was the meat market of colonial Boston.[11] To supply this market there grew up, during the occupation at Cambridge by the provincial army under Washington then besieging Boston, the slaughtering industry at Brighton, the importance of which in the development of the meat packing industry in after years will be noted later.

The Middle Colonies

The Dutch West India Company brought over the first livestock to New Netherland. Each tenant was given cows, sheep,

[10] One regulation ran thus: "No unwholesome, stail or blown meat or leparous swine shall be sold or exposed to sale in the market under penalty of 10s."

[11] The crude ideas of a market of that time may be seen from a vote of 1745—"all small meat, before brought in, must have the feet cut off and quartered and cleaned from brains."

and pigs for six years. In the beginning the pioneers lived in sod cabins, later on in log houses, and their staple product was hogs, which wandered in the woods and fed on acorn and nuts and in the winter at least furnished a hard, clean pork. Soon, as a result of a liberal policy, settlers increased in numbers and little villages grew up along the shores and rivers. The cattle were mostly of the Holland breed and larger than the English cattle. Grazing for slaughtering increased. Hogs multiplied with great rapidity. English breeds were more hardy, but Holland hogs grew larger and heavier and had thicker pork. Sheep were not as numerous as in New England.

During the Dutch period the slaughter houses and cattle pens in New Amsterdam were almost as important elements of the landscape as the windmills in Holland itself. They straddled the ditch on the north side of the palisade that later gave its name to Wall Street, the effluvia flowing down this streamlet through the Water Poort, or Water Gate, into the East River. Hog pens, outhouses, and other nuisances encroached upon the crooked streets.

The material prosperity which the English brought to New York was apparent in the increase in trade, especially trade in provisions and meats. Governor Andros in 1678 mentions "beefe" and pork as articles of export from New York.[12] Indeed, like the New England colonies, New York carried on a brisk business with the West Indies in salt beef, hams, bacon, and livestock. Though not as important as Boston or Philadelphia, New York was becoming a cattle market and the center of a region supplying cheap livestock and meats.

Slaughtering in New York

Early in the history of the colony we find the butchers of New York City subject to definite rules regarding slaughtering. In 1656 an order was put into effect as follows:

[12] Quoted by DeVoe, The Market Book, Vol. I, p. 87.

> From this time forth, neither in this city, nor in the plains belonging to this province, shall any cattle, hogs, goats or sheep be permitted to be slaughtered, not even by the owner himself, unless the owner first, on the same day he intends to slaughter, shall have given in such creature as his own, to the magistrate of the respective place to which he belongs and from him obtain a slaughter certificate.

For this a fee was exacted according to the size or value of the animal which was paid to a public officer, called the "slaughter farmer."[13]

At the same time sworn butchers were ordered and confirmed "who shall each be bound to serve in butchering and cutting up, and to provide, have and possess their own ropes, hand barrows, troughs and other articles requisite for slaughtering and receive certain fees" which were stated. The oath taken was a solemn one.[14]

Previous to 1676 cattle were slaughtered in the city below Wall Street and on the Brooklyn shore, but it became so objectionable that the killings were ordered outside the city wall. This, however, gave the "slaughter farmers" so much trouble in the examination of each animal, and there were so many wrangles as to their value, that the authorities had a public slaughter house built on a spot now on the east side of Pearl Street between Wall and Pine. It was set forth by the "slaughter farmers" that "all persons should have liberty to kill and hang therein meat, these paying for the same as formerly," i.e., so much per head according to the value of the animals. At this time the average number of cattle slaughtered in New York was 400 a year; by 1694 it was about 4,000. Later an ordinance of 1749 forbade any killing outside the public slaughter house.[15]

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[13] DeVoe, Abattoirs: a paper read before the Polytechnic Branch of the American Institute, June 8, 1865, p. 7.

[14] It was as follows: "We doe swere in the presence of Almighty God, that we, as sworne butchers of this citty, shall kill noe cattle, hoggs, etc., without a ticket of consent from the collectors of the mayor and aldermen except it be for the Rt. Hon. Governor Richard Nicholls. So help us, God Almighty." (DeVoe, Abattoirs, p. 8.)

[15] DeVoe, p. 9.

During the Revolution many butchers took advantage of the war to put up their own slaughter houses. This proved a blow to the public slaughter house. In order to provide for the increasing business the butchers who had early organized a trade guild in 1789 petitioned that they be allowed to kill on their own land, and if that were granted they were willing to assure the keeper the payment of his fees for the term of his office. The butchers were further willing for the council to appoint as many of them as necessary inspectors of their several slaughter houses. This petition was granted, and in this way there came to an end the system of public slaughter houses in New York.

Maryland

Maryland is sometimes called a middle Atlantic colony, sometimes a southern one. True, there was not found there the variety of economic life of New York and New England, yet on the other hand there was not the conservatism of Virginia and South Carolina. The first domestic animals in Maryland came from Virginia and towards the end of the seventeenth century most of the people it is reported "have good Tracts of Land and Stocks of Cattle and Hoggs."

In 1793 the Maryland Assembly passed an act directing the purchase of 10 acres of land in or near Baltimore and the laying out of the same in small lots with proper enclosures and stalls for the cattle and declaring Thursday of every week to be a market day for the sale of livestock of every kind.

Pennsylvania

Pennsylvania, the latest of the northern colonies to be established, was fortunate in being unhampered by greedy trading companies as in New Netherland, or by a landed aristocracy as in Virginia. The prosperity of Pennsylvania was even more largely due to the solid character of its yeomen settlers and

its fertile soil. Cattle were allowed to forage at large and increased in number to such an extent that William Penn was able to open up a cattle trade with the West Indies, at the same time providing for home distribution and consumption of stock by founding two markets each week in Philadelphia, Chester, and Newcastle, and establishing two annual fairs in the colony. As a result Pennsylvania was early famous for its exports of cattle, hogs, beef, and pork products.

The packing of meats was established prior to 1729 in Philadelphia. Among the acts passed by the assembly in that year was a very long and minute one "for more effectually to prevent unfair practices in the packing of beef and pork for exportation." It directed the size and material of casks; required that they should be branded with the marks of the coopers who made them; and ordered that the contents should be inspected, after which the casks should receive an inspector's brand.[16]

The Quakers and the Germans rivaled each other in fattening stock. By the middle of the eighteenth century the Philadelphia market and the Pennsylvania fairs were the banner ones of their kind in America.[17] Not only were herds of cattle driven down from the upper valleys in Pennsylvania to the farms near the markets, but great droves were even driven all the way from Virginia and the Carolinas.

Southern Colonies

There were cattle in Virginia before 1609 and in spite of the hostility of the Indians the livestock throve wonderfully. This was due partly to strict measures instituted by the colonists against useless killing of livestock, and partly to the free-

[16] Scharf, J. T., and Westcott, Thompson, History of Philadelphia (1884), Vol. III, p. 2284.

[17] Gregg, Old Cheraw, p. 109. Turner, Old West, p. 221. Kalm, North America (1748), Vol. I, p. 54, states that the fairs were held on the 16th of May and 16th of November. The market days were Wednesday and Saturday when provisions were brought in. In summer there was a market almost every day from 4 or 5 A.M. until 9 A.M. because meats and other victuals won't keep in great heat.

dom given the cattle.[18] By 1627 there were from 2,000 to 5,000 cattle in Virginia,[19] though many of them were of stunted growth due to lack of proper care. Shortly after this a range system was worked out by fencing off a peninsula as large as the English county of Kent where the cattle could wander at will. The country around Jamestown formed the principal cattle preserve of the colony.[20] No fences or buildings were allowed on the range and it proved of great benefit to the small planter, who in this way had a boundless expanse open for his cattle. As in the later cattle ranches of the West, branding was resorted to in order to identify the cattle.

For a long period of our colonial history in Virginia, as elsewhere, the principal value attached to cattle was for their hides. The colonial assemblies passed laws encouraging the tanning of leather, prohibiting, however, its importation and even regulating the shoemaking business. Farmers took their hides to a currier to have them tanned and returned, and then let itinerant shoemakers work them up into footgear for the family. Besides this there were tanners and shoemakers who did an independent business.

Hogs in Virginia

Hogs were so numerous in Virginia that one writer states "they swarm like vermin"[21] and they were not even listed in an inventory of an estate. They were considered of so little value at that time that the crime of stealing and killing hogs was rarely punished, for it was held that they were of no expense to their owners as they roamed about the forests and marshes. It was thought necessary as time went on, however,

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[18] Force, Tracts, Vol. III. One of Sir Thomas Dale's edicts ran thus: "Wee do strictly charge and command that no man shall dare to kill or destroy any Bull, Cow, Calfe, Mare, Horse, Colt, Goate, Swine, Cocke, etc., of what condition so-ever; without leave from the Generall upon paine of death and in the accessory burning in the Hand, and losse of his eares, and unto the concealer of the same foure and twenty hours whipping with addition of further punishment as shall be thought fit by the censure and verdict of a martial court."

[19] Bruce, Economic History of Virginia, Vol. I, p. 202.

[20] *Ibid.*, p. 312.

[21] Beverley, p. 262.

to make the hog stealer suffer for disregarding the rights of others. But instead of calling his act a felony, the law simply imposed a fine of 1,000 pounds of tobacco and in default of payment compelled him to enter for twelve months the service of the owner whose hog had been stolen. No one paid heed to this, so a later law was enacted providing that on the second offense the hog stealer should be placed in the pillory for two hours with his ears nailed to the beam and at the end of that time they should be cut loose with a knife.[22] Finally, when the third offense was declared a felony, the habit of hog stealing ceased to some degree.

From our modern point of view little care was given livestock in Virginia, but, notwithstanding, the pork and beef of the colony was declared the best in America and was largely exported. Indeed, so important did the trade become that the size of the barrel was prescribed by law, and public packers were appointed who were heavily fined if they accepted unwholesome meat, or allowed it to be placed in a barrel above or below the legal size. The justices of the peace chose marks for the barrels shipped from their jurisdictions and the quantity which each contained was also stamped on the face of the cask.[23]

The Carolinas and Georgia

The first livestock of the Carolinas was driven from Virginia when the settlers moved south. In the early part of the eighteenth century the cattle began to increase and the development followed of what was in colonial times regarded as the best cow country in America. This was in the uplands of North and South Carolina.

> The borders in the Valley of Virginia and on the Western highlands of the Carolinas were largely engaged in raising horses, cattle, sheep, and hogs which grazed at will upon the broad

[22] Henning's Statutes, Vol. II, pp. 440–441, quoted in Bruce, Vol. I, pp. 378–379.
[23] Bruce, p. 485.

slopes of the eastern foothills of the Alleghanies, most of them in as wild a state as the great roving herds now to be seen upon the semi-arid plains of the Far West.[24]

In spite of the narrow policy of the founders of the colony, who wished to restrict the people to the cultivation on plantations of staple crops, the restless population moved inland towards the frontier where the cow-pens or ranches took the place of the log cabins of the hunters in the Piedmont region of South Carolina. A cow-pen was a rough noisy frontier settlement, often developing into a town like the later cow-towns of the western ranges.[25] If pasturage was good the cow-pen would remain in one place, but if population increased or pasturage decreased, the cow-pen keepers pushed ahead westward.

Careless Methods

The system, though it did bring a profit, was needlessly wasteful. The fact that the climate was mild made the planters feel that great care was unnecessary. It must be acknowledged, however, that the system did produce great herds of cattle which found a ready market either alive or as barreled beef. It was customary at regular seasons to drive the cattle to the coast towns of Charleston, Norfolk, Baltimore, and Philadelphia,[26] but at times the herds were sold to professional drovers who took them to town.

As in Virginia, every planter in the Carolinas had plenty of hogs. The immense quantities of acorns and nuts in the woods afforded an ample supply of food and the hogs ran

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[24] Thwaites, Daniel Boone, p. 35.

[25] Logan, History of Upper South Carolina, Vol. I, p. 149, describes these cow-pens thus: "Having selected a tract where cane and pea-vine grass grew luxuriantly they erected in the midst of it temporary cabins and spacious pens. These were used as enclosures in which to collect the cattle at proper seasons for the purpose of counting and branding them. . . . A cow-pen was quite an important institution. It was usually officered by a superintendent and a corps of sub-agents, all active men, experienced woodsmen and unfailing shots at long or short sight with the rifle. For these a hamlet of cabins was erected, besides the large enclosures for the stock, all of which with a considerable plot of cleared land in the vicinity for the cultivation of corn, made quite an opening in the woods."

[26] Gregg, pp. 68, 110.

wild and fed on these and on peaches. As a result "no English colony on the continent was so rich in hogs and good pork as the Carolinas." When wanted, the livestock was shot, for no other way was feasible. Thousands were killed, salted, and exported to the West Indies. Pork was a valuable export from Charleston, and Cheraw bacon rivaled in the South that of Connecticut in the North.

Following the example of South Carolina, Georgia became an important cow country late in the eighteenth century and cow-pens became familiar there. As for Florida and Alabama, there is good evidence for the statement that De Soto and other Spanish explorers owned droves of hogs and that they were well known as early as 1540. It may be that in some sections the wild hogs of a later day were at least in part descended from this stock.

A Frontier Activity

Regarding livestock and meat packing in colonial America, it is well to note that very early the raising of cattle and hogs and the curing and pickling of beef and pork became of special interest and one of the chief activities of the colonists. Stock raising in every one of the colonies was primarily a frontier activity.[27] Even in colonial times this frontier had moved from the coast until in the middle of the seventeenth century it was at the head of river navigation or the "fall" line.

> By 1700 the frontier in New England was marked by the foothills of the White Mountains and the Berkshires; in New York the edge of the wilderness was above Albany and beyond the German Flats in the Mohawk Valley; in Pennsylvania settlement was still confined to the region around Philadelphia; in Virginia the tidewater remained the frontier until the discovery of the Shenandoah Valley; in the Carolinas the frontier was barely eighty miles from the coast in 1700.[28]

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[27] Turner, The Old West, p. 185.
[28] Thompson, Chap. IV, p. 28.

After the westward movement in the eighteenth century the frontier included the back country of New England, the Mohawk Valley, the Great Valley of Pennsylvania, the Shenandoah Valley, the Piedmont, lying between the Alleghenies and the head of navigation of the rivers. Along all this frontier line cattle and hog raising and small farming were the principal enterprises. This was where the very considerable packing and curing of meats of colonial America was done, mostly by farmers, though now and then by men who made it their sole business.

The Agrarian Migration

The War of Independence brought the beginning of a new era in the agricultural history of America. The most important feature of the new period was the agrarian migration and the shifting of the center of livestock raising to the Ohio Valley. This made possible, indeed, made necessary, the rise of an organized industry of meat packing in the livestock area, with its headquarters at Cincinnati.

After the Revolution there was little beef raising in Massachusetts except in the Berkshires. Much attention, though, was given to sheep breeding, causing Governor Hutchinson to note in his "Diary" that Massachusetts was "the most sheepish of the colonies." Boston remained, however, the largest live cattle market in New England, though by this time most of the cattle sold there were raised in New Hampshire and Vermont and driven to Boston.

Connecticut became the leading stock raising state of New England and the ports of New London, New Haven, and Norwich did a big business with the West Indies in live cattle and pork products. Connecticut hams were the most famous in the North.[29] The center of stock raising was Hartford.

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[29] Coxe, View of the United States, p. 92, states that the name "Connecticut" was given to all the pork of Pennsylvania and New Jersey. "Burlington" was the term applied to pork north of Jersey. Both, Coxe says, were fully equal to the pork of Ireland and Brittany and much cheaper.

Atlantic States More Settled

In the main, however, New England developed a more settled agriculture. And the same was true of the middle states. It was in the middle states that during the Revolution distinct impetus was given to the preserving of beef in America. Owing to the American blockade of New York, not enough cattle could be got and a great deal of English corned beef, then a novelty, was imported in casks of 112 pounds each. The papers of the time, for example, the *New York Gazette* and the *Royal Gazette,* refer to it in advertisements as "the best London beef preserved by the new method, with saltpeter, spices, etc."[30]

As to the meat trade in general, in New York City there was still a vicious combination of the butchers which controlled prices, the farmers protesting against this monopoly. At this time also the New York markets were "very much inferior to those of Philadelphia," probably because of their inaccessibility.

The opening up of the rich Genesee country just before 1800 represented a very significant advance of the frontier. What is now central New York and the lake region became settled at that time. Many of the pioneers of the Genesee Valley were New Englanders who brought livestock with them. However, they did not slaughter, nor sell their cattle for some years, wisely preferring to build up their herds. They lived on pork and when the Erie Canal was put through, 1817–1825, they were able to supply the thousands of canal workers and in addition were able to send great numbers of cattle into eastern markets on the completion of the canal.[31] It was in supplying these demands that Buffalo first emerged as a meat packing and livestock market center. A few years later there is a record of hundreds of steers being slaughtered in Buffalo

[30] *New York Gazette,* June 21, 1779, and *Royal Gazette,* October 13, 1779, quoted by Thompson, Chap. V.
[31] Thompson, Chap. V, p. 17.

for the English market and of the beef being salted, pickled, or packed.[32]

Pennsylvania Stock Leader

Pennsylvania continued to hold its leading position in agriculture and animal husbandry. The best stock farms in the United States were in the counties around Philadelphia. It was a paradise for the fat cattle raiser. Buying lean cattle and fattening the same was a profitable business. Because of this, Philadelphia was a great export place for beef, pork, and dairy products.[33] Baltimore had the same kind of trade, though in a less degree, her chief exports being Maryland and northern Virginia pork products.[34] In the first two decades of the nineteenth century the Pennsylvania farmer began to fatten western cattle. The Germans still clung to hog raising, but few others did so on a large scale as the bulk of the hogs in time came from the West. An interesting note of the period is that until 1825 in both New York and Philadelphia hogs ran at large in the streets as scavengers.[35]

After the Revolution, Virginia continued its shiftless methods of farming and livestock raising. The planters raised just enough corn for their own needs and to an extent those of the cattle, though the latter often had to eke out this fodder in the late winter by hunting their food in the woods. Many cattle died and some became wild.

Hogs were so numerous that they became a nuisance. If the planters had raised more corn they could have fattened these hogs sufficiently to make Norfolk rival Philadelphia and Baltimore as a place of export for ham, bacon, lard, and pork products. However, the planters were indifferent to the possibilities. When hogs were required for food they were shot, this being their only means of securing them. Often the planters amused themselves with the sport of pig-shooting.

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[32] New York State Agricultural Report, 1843, p. 442.
[33] Travels of the Rochefoucauld Liancourt, Vol. II, p. 367.
[34] Schoepf.
[35] DeVoe, Market Book, p. 481.

South Still Wasteful

Wild cattle and hogs also roamed the woods in the Carolinas. Huge droves of these were driven at intervals to Charleston, and even larger numbers to Baltimore.[36] As these hogs fed on mast and acorns and produced bacon which was soft and did not keep well, and the lard was thin, Carolina hogs were often corn-fattened in the North for marketing. Also since the South raised little corn the cattle were not fattened before killing and the butcher's meat in Charleston was neither fat nor of good taste.[37] Though this was a most careless method of stock raising the profits were large, for with the exception of the cost of driving to market and a few weeks' fattening, the expense was negligible.

Stock raising then and the preserving of meats for export continued to be an important activity in the period succeeding the Revolution, but it was done chiefly by the planters and farmers and very few people made their sole business that of meat packing. Most of the trade was with the West Indies, as the colonial custom books show. For example, in 1770, 244 barrels were shipped to the south of Europe, while there were sent to the West Indies 2,870 tons of beef and pork, making about 28,944 barrels valued at £66,035, or $277,000.[38] In 1770 there were 185,143 pounds of tallow and lard exported; in 1804, 2,565,719 pounds of lard and livestock. This trade which fluctuated, of course, according to the opportunities for commerce during the wars in Europe, was fostered by bounties granted by Congress.

Improving Sheep

Several changes came into agriculture with the nineteenth century, most important of which for stock raising was the importation of Spanish merino sheep. Jefferson, Madison,

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[36] Smyth, Tour I, p. 263, mentions seeing hogs in droves of one, two, and even five hundred along the Virginia roads from the back settlements going to the coast.
[37] Schoepf, Vol. II, p. 189, quoted in Thompson, Chap. V.
[38] Pitkin, Statistical View of the United States (1817), p. 124.

and Washington were all interested in this and they imported quite a number. The first importer, however, was Colonel David Humphreys of Derby, Connecticut, who was Minister to Portugal, 1790–1794, and then to Spain, 1797–1802. He sent a small flock from Spain to Connecticut in 1802.[39] Another man, Chancellor Livingston of New York, American Minister to France in 1802, brought over to America a merino ram and two ewes from a flock belonging to the French government. Later, in 1812, he wrote his "Essay on Sheep," the earliest American work on the subject. William Jarvis, United States Consul at Lisbon, established a merino flock in Wethersfield, Vermont. All New England profited as a result of sheep importations, but Vermont became the banner state. Later the scattering of the flocks of Spain because of the political turmoil there led importers to turn to Saxony. Then arose a wave of speculation culminating in the "Merino Bubble" burst, with the result that sheep raising did not get on its feet until 1830. At this period interest in sheep was more on account of wool than mutton, for it was not until much later that Americans began to eat mutton to any great extent.

From the writings of the time it is clear that in the second and third decades of the nineteenth century the colonial methods of stock raising were no longer practicable in the Atlantic states. The forests no longer yielded unlimited herbage for stock which wandered at large. In many places the forest was a resource for but two or three months and in other places not at all. Yet the farmers foolishly tried to keep the same number of cattle on their farms as they had on the unenclosed pasture. The result was poor and unprofitable cattle.

Stock Raising Moves West

Such was the situation after the War of 1812 when, in Channing's phrase, "the American people . . . . addressed itself to the solution of the problem of the nineteenth century,"

[39] Patent Office Report, 1854, p. 28.

namely the settlement of the "New West," or the country beyond the Alleghenies. It was necessary to find a new region for settlement and for stock raising. The mountains no longer served as a frontier. The frontier and the cattle and hog country had preceded civilization westward. Professor Thompson says:

> This New West was composed of three sectors, each with definite physical boundaries: First, the North West, between the Great Lakes and the Ohio River; second, the Central West, the territory south of the Ohio River and in the Valley of the Tennessee River; third, the South West, from the south side of the Tennessee watershed to the Gulf. The North West was the west for western New York and Pennsylvania and part of Virginia; the Central West was the west for Virginia especially, but also in some degree to upland Carolina; the South West was the west for the Carolinas and Georgia. The states of Ohio, Indiana, Michigan, Illinois, and Wisconsin have been carved out of the first; Kentucky and Tennessee out of the second; Alabama and Mississippi out of the third. In general it may be said that the population of New York, Pennsylvania and the upland south overflowed into the North West; that of Virginia into Kentucky and Tennessee; that of the Carolinas and Georgia into Alabama and Mississippi.

Prior to the Revolution pioneers had gone from Virginia and the Carolinas into Kentucky and Tennessee. As a result of the treaty of Fort Stanwix made with the Indians in 1768, the country west of Virginia—the Kentucky and Tennessee of today—was a neutral zone. The Kentucky, the Cumberland, and the Tennessee rivers were natural ways to this rich region, and so about the beginning of the Revolution there were several little settlements in Kentucky at Louisville and in Tennessee at Nashville. By 1790 there were 100,000 people in Kentucky.

Kentucky Improves Cattle

The Kentucky farmers began early to give attention to bettering the breed of cattle. In 1783 Messrs. Goff, Ringold, and

Patton of Baltimore imported some pure short-horn cattle from England to improve the breed in the United States, and in 1785 a son of this Mr. Patton took a bull from that importation to Clarke County, Kentucky. Mr. Patton, Senior, some time later followed his son, taking with him another portion of the same lot of stock. This old bull, then aged 18 years, was sold at auction for $133.33. It is from these cattle that the famous "Patton stock" came.[40] In 1817 an importation of three bulls and three heifers, probably Durhams, was made by Colonel Lewis Sanders of Lexington, Kentucky, followed shortly by several others. These were interbred among themselves and into the Patton stock and laid the foundation of many valuable Kentucky breeds. In 1816 two pairs of Hereford cattle were imported into Kentucky by Henry Clay and taken to his farm near Lexington.

The settlement of the country north of the Ohio River was later than that of Kentucky, though there had been a French occupation of the Ohio-Illinois country and during that period settlers made considerable progress. They had large herds of hogs and black cattle, and from the Wabash posts in 1746, 600 barrels of flour were shipped to New Orleans. Salt beef, tallow, flour, and pork were regularly sent to New Orleans.[41] However, it was a considerable time before the Ohio country, as compared with Kentucky, was thought of as a good cattle region.

Ohio Valley Cattle Raising

After the Revolution the Ohio Valley was settled, at first mostly from Pennsylvania. "As has been pointed out the majority of the settlers came from the Upland South. As the Ohio Valley as a whole was an extension of the Upland South, so the Upland South was, broadly speaking, an extension from

[40] United States Agricultural Report, p. 296. (H. Exec. Doc., Vol. XV, 1866–1867.)
[41] Benton, The Wabash Trade Route, J. H. U. Pub. XXI, p. 24.

the Old Middle region, chiefly from Pennsylvania."[42] Pioneers from this Upland South often brought their cattle with them, but those from more remote points like New England of course did not.

In 1794 two events occurred which greatly stimulated the settlement of the Ohio country and gave an impetus to cattle raising. The first was the elimination of the Indian menace in the Northwest after the battle of Fallen Timbers on the Maumee (August 20, 1794) and the treaty of Greenville, which shifted the Indians further west. The second event was the Whiskey Rebellion in western Pennsylvania. In that state the farmers had found that the best way to convert corn into a marketable commodity was to manufacture home-stilled whiskey. This could be packed in small kegs and taken to the coast at great profit. At that time it was not thought possible to feed corn to cattle and hogs and drive the livestock from so far in the interior to the seaboard with profit. For a time the farmers had disposed of their surplus livestock by floating the cattle and hogs down the Ohio and Mississippi rivers to New Orleans, then a Spanish town. It took a long time, but was a cheap method and the stock sold for $12 per hundredweight.

The establishment of an internal revenue system and the placing of an excise tax upon whiskey deprived the farmer of the right to convert corn into whiskey, so he had to turn his attention to the raising of cattle and hogs, which soon increased so fast that the New Orleans market was glutted and another way had to be found to get rid of them. Between 1815 and 1830 Ohio was the cattle and hog raising country of the United States.[43] By 1830 it had ceased to be characteristic of frontier conditions.

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[42] Turner, The Ohio Valley in American History, *loc. cit.*, pp. 38–39.

[43] Some prices of this time are given in Holme Journal, in Cobbett, Pt. III, p. 105, near Zanesville, in 1818: Beef, per 100 lbs., $4; pork per 100 lbs., $4; live hogs per cwt., $3; cows (best), $18. Melish, Travels (1819), p. 401, near Lexington, Kentucky: Beef, 3 cents per lb.; mutton, 83 cents per side; veal, 81 cents per side. Faux, Travels (1819), p. 197, near Lexington, Kentucky: Beef, best cuts, 6 cents; common cuts, 3 cents; whole fat mutton, $2.50. *Ibid.*, p. 180, Indiana: Beef, pork, 4 cents per lb.; bacon, 10 to 12 cents.

Indiana and Illinois

Indiana and Illinois in 1830 were in the same condition that Ohio was in 1810. Of the three states Indiana, even in its pioneer days, was never as good a stock raising country. For this there were many reasons. It was more heavily wooded; the southern part was hilly and broken, the northern part marshy. The population in its early history was lawless, in fact notoriously so. Even an Indiana judge was suspected of stealing hogs and shipping them on flat boats to New Orleans. Further, since Indiana was too far away from eastern markets to make droving profitable, the market for her cattle and hogs was restricted to the river trade, and to Kentucky. Besides, the first Indiana legislature by the laws it passed did not give settlement the proper encouragement. On the other hand, the pioneer history of Illinois is very much a repetition of that of Ohio twenty years earlier.

The Illinois prairies were ideal for grazing and about the only attention given the cattle was salting them from time to time. By 1818, when Illinois became a state, it was in the stage of extensive cattle raising. The cattle ran at large, with the hogs feasting on the prairie grass and nuts. Still, cattle rearing was a business of limited possibilities. Droving as far as the eastern markets was impossible, though some Ohio drovers came over to Illinois to buy cattle. New Orleans was the great market. However, Illinois had the competition of the down-river trade in cattle, beef, hogs, salt pork, ham, bacon, etc., to compete with, and the New Orleans market was likely to be often glutted. Cattle raising on a big business basis did not obtain until the opening of the railroads brought quicker and greater transportation.[44] As for sheep:

> In spite of the fact that sheep could not be kept upon the prairies without considerable attention, especially during the winter months, the industry rapidly gained favor among the farmers. Heavy losses were at first experienced, due chiefly to

[44] Thompson, Chap. VI.

mismanagement, for the animals usually purchased in western New York or Philadelphia were driven the entire distance during the hot summer months or the colder ones of autumn to a new home where scarcely any provision had been made for their sheltering. As a consequence many died.[45]

Missouri

The last state to be considered is Missouri. The French had had settlements there, for example, at St. Louis, but though cattle and hogs ran wild it was never, except incidentally, an agricultural region. As the states on both sides of the Ohio filled up, the surplus population overflowed soon into Missouri. After the War of 1812 the hard times in New England and elsewhere drove thousands west. The rapidity with which Missouri was peopled was remarkable. The lure was the same as Kentucky, namely, rich prairies and cane along the rivers.

Stock raising was largely followed in early Missouri and it was quite the equal of Illinois and Ohio. Indeed in one particular it had a great advantage in accessibility to market, for flatboats bearing livestock, beef, and pork products could start earlier for New Orleans than from places along the Ohio and the voyage could be made more quickly. The Missouri stock raisers also found a close market in the lead and zinc mining colonies in the state and army garrisons.

While there was considerable progress in extension of population half-way across the continent, the further development of the middle west states was held back by the lack of transportation facilities. In the earlier years most of the settlers' transactions had been upon a barter basis, and horses, cattle, and hogs were often exchanged for groceries and other store goods. Indeed transportation was so meager that for a time in the interior it was hardly worth while to have a surplus of anything. The people in the frontier parts had all the livestock they wanted, and generally speaking the value of the

[45] *American Agriculturalist*, Vol. IV, p. 247, quoted from Pooley, Settlement of Illinois, pp. 549–550.

animals depended more upon their immediate utility to their owners than on the cash into which they could be converted.

Westward Movement Pauses

After the admission of Missouri the westward movement paused. It is time to consider what breeds of livestock were being introduced into this Middle West, the methods of marketing, and the distribution of these raw materials of the meat packing industry which began in this period in a small way in many villages and towns in Ohio, Kentucky, Indiana, and Illinois, and which, especially in Cincinnati, attained very great development by the Civil War.

By commonly accepted license reference has been made to the "packing industry" as that industry which prepares the various kinds of meat for market. As a matter of fact, "packing" comprises today the very smallest portion of the whole meat industry, and it has always held a relatively unimportant place. In early times meat was preserved by drying in the sun. A step removed from this was the later method of smoking the meat so as to hasten the drying process. Then various ways of curing hams in addition to smoking were discovered. Sometimes smoked meats were shipped in barrels, but ordinarily they were shipped as "bulk" meat. With the increased demand from abroad for American meats, together with the demand from the southern plantations for meat for the negroes, and from the seagoing vessels for pickled meat to supply their crews, the real business of "packing" began. Dried and smoked meats would not do for these classes of consumers, and therefore pickled meats came into use to satisfy them. Very large quantities of "bulk" meats were prepared every year, and although a very small portion of these were barreled or packed, we must include them in any consideration of the packing industry, just as today the "packers" ship in refrigerator cars the greatest portion of the meat which they have slaughtered, and "pack"only a negligible portion.

CHAPTER II

LIVESTOCK IN THE MIDDLE WEST—1830–1870

Changes in Stock Raising

Early conditions surrounding the meat packing industry, whose progress has been traced to the Middle West, were very much the same everywhere and did not change radically until about 1870. However, in the three decades before the Civil War there were great changes in the extent of the cattle and hog raising country through the addition of Michigan, Iowa, Nebraska, and Kansas, which introduced the highly important factor of free or cheap land, and by the revolution in the agricultural system from the old woodland agriculture to the new order of farming with its new methods of tillage, use of artificial fertilizers, foreign breeds of cattle, new crops, and new machinery and implements, as grain cradle, mowing machine and reaper.

Other contributing factors influencing the revolution were the rise of agricultural periodicals and farm literature, the building of the railroads, a tremendous development of transportation and markets, and the work of the federal government in establishing an agricultural bureau and in enacting the pre-emption law of 1841 which guaranteed land titles to settlers. These culminated in 1862 in four far-reaching events, the establishment of the Department of Agriculture, the founding of the land-grant colleges (Morrill Act), the federal charter of the Union Pacific Railroad, which was completed in 1869, and the Homestead Law.

All these movements were modifying factors conditioning

the history of American livestock, but the one influence which is the most important and direct was the importation of foreign breeds and their growth in America.

Creating the Modern Hog

The most thoroughly American domestic animal is the American hog. And of the different types much more attention has been given to the lard type than to the bacon type of hog. The American hog raiser improved his hogs to a greater degree than was the case in cattle and sheep. He did not import whole herds of blooded stock, but was content to use the mongrel sow of colonial ancestry as a base upon which he crossed imported Chinese, Neapolitan, Berkshire, Tamworth, Russian, Suffolk, Black, Byfield, and Irish Grazier boars. These importations began as early as the second quarter of the nineteenth century.

In the creation of the modern hog the object has been to produce an animal which would put its flesh on its sides and quarters instead of running to bone and a big head. The effort of the breeder has been to elongate the intestine of the hog so as to make him more able to transmute into meat and fat the corn which he consumed.

The English Berkshire hog was developed from the old English hog, the Chinese, the Siamese, and the Neapolitan. This is one of the oldest of the established breeds, but is comparatively recent. Even in the forties in England there were complaints as to the reversion of Berkshires to the older type. The Bedford hog was introduced into the United States by a Mr. Parkinson, an Englishman living near Baltimore, at about the beginning of the nineteenth century. In Massachusetts and New York it was known as the "Woburn" hog. The Byfield was originated about 1838 by a farmer in Byfield, Massachusetts, who by chance found in the market a hog of remarkable appearance, of great size, white, with heavy lopped ears, flat-sided, but of great length. Crossed with the Russian

and Chinese the improved Byfield founded a breed popular in New England and in Ohio.

The ancestors of the Irish Graziers were brought from Ireland by Irish immigrants. When crossed with the others mentioned they produced a good all-round hog notable for its ability to thrive on grass, refuse, garden truck, and potato peelings. They were white in color, with a few black spots and upright ears. Their stock later gave to the Poland Chinas their fine coating and symmetry of form.

Results of Crossing Breeds

The result of the crossing of these breeds was several genuine American breeds of hogs, such as the Chester White, first bred in Chester County, Pennsylvania, the Poland China, greatly valued in the Ohio Valley states and the Jersey Red, or Duroc breed, which furnished heavy pork for the West India trade. In northern Indiana a popular variety of white hog called "Victorias" were thought to be even finer than the Chester Whites. Most popular of all, however, was the Poland China breed which held the place among hogs that the Shorthorns did among cattle.

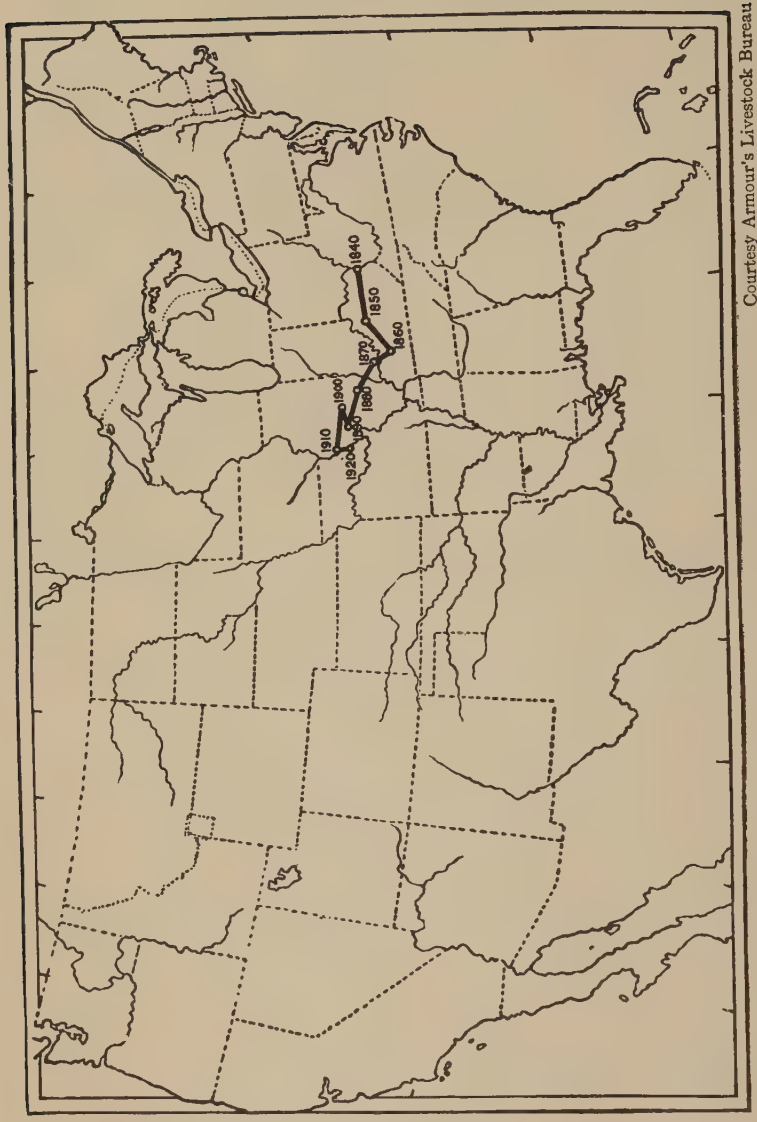
For the period preceding the Civil War it is difficult to get accurate statistical data. Fortunately, however, the matter was the subject of special study during 1900 and the results were published at that time.[1] The importance of the development of hog raising in the Middle West is seen in the statement made in 1849 that the value of the pork grown in the United States at that time was nearly or quite three times the value of the cotton.[2]

Changes in Hog Regions

From 1840 to 1860 the number of hogs increased in number, but decreased in proportion to the population of the United

[1] Monthly Summary of Bureau of Statistics, United States Treasury Department, February, 1900, p. 2279 *et seq.*

[2] *Prairie Farmer* (1849), Vol. IX, p. 14.



Courtesy Armour's Livestock Bureau

Figure 2. (a) Map Showing Change in Center of Hog Production, 1840–1920

States. In 1840 there were 26,301,293; in 1850, 30,354,213, and in 1860, 33,512,867 in the United States. For every 100 inhabitants there were 154 hogs in 1840, 131 in 1850, and only 107 in 1860.

The change in the location of the hog raising industry was similar to that of the change in corn production. Thus as early as eighty years ago the number of hogs in New England began to decline rapidly.

In the middle states, as in New England, the decline was most rapid in the decade between 1840 and 1850 and occurred in each of the states of this group, being especially marked in New York.

In the west central states (Ohio, Indiana, Illinois, Michigan, Wisconsin, Kentucky, Kansas, Nebraska, Iowa, Missouri, and Minnesota) there was a considerable increase in the number of hogs from 9,252,000 in 1840 to 14,435,000 in 1860. Changes were evident here, however, the trend being towards the west. The greatest hog raising section during this period from 1840 to 1860 was in the South. This district (comprising Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North and South Carolina, Tennessee, Texas, and Virginia) contained in 1840, 46 per cent, in 1850, 52 per cent, and in 1860, 46 per cent of the total swine of the country. The comparative decline in hog raising in the South since 1850 has been one of the most strongly marked features of the development of this industry in the United States.

The development of hog raising from 1850 to 1860 is in many ways similar to that which has occurred in more recent times, the number of swine decreasing in a district as the population increases. The comparatively high value of hogs per given bulk renders them capable of being transported a long distance and makes it more profitable to raise them where land is cheap, even if the distance from market be greater. On the other hand, this tendency is partially affected by the fact that hog raising is an industry which is naturally carried on upon a

small scale, as the hog is the means of utilizing and converting food matter and waste which would otherwise be lost. The advantage of having a few hogs upon each farm has, therefore, retarded the tendency of the westward movement, but has not entirely nullified it.

Early Hog Habits

A greater contrast can hardly be imagined than that presented by a comparison of the hogs in the Middle West a century ago with those of today. Whatever breed they might previously have been, the prevalent system of allowing all "domestic" animals to run wild in the woods soon caused any distinct strains to be lost in the mixed swine of the country. Such nondescript animals were typical of the frontier and were, indeed, the only kind of hogs that could thrive under the conditions imposed by the wilderness. It is quite possible to trace the advance of the frontier by noting the kind of animals which the settlers raised. The descriptions of the stock of Illinois in 1820 correspond very closely with the reports of the previous decade which tell of the Ohio hogs, or with those regarding the hogs in the western portion of Virginia and the Carolinas at an earlier day. The stunted cattle and lean hogs of the mountainous regions of Tennessee, Missouri, and Arkansas at the present time are direct lineal descendents of those which constituted the frontier farmers' only stock. Animals of this type continue as long as the conditions which produce them remain.

The pioneer hogs of the West were long and slim, long-legged and long-snouted, "slab-sided," large-boned, gaunt-bodied, flap-eared, with arched back and bristled erect from head to tail.[3] The various names with which the settlers aptly christened them tell what they looked like better than could be indicated by any extended description. They were "painters,"

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[3] History of Madison County, Ohio, p. 473. *Union Agriculturist and Prairie Farmer* (April, 1841), Vol. I, p. 31.

"rovers," "sappling-splitters," "wind-splitters," and "razor-backs."[4] They were of medium size, their hard usage making it impossible for them to gain any great weight.

In the early days hogs were reared most extensively in the thinly settled regions, where they could roam at large over wide tracts of forest. Every farmer had at least a few, and it was not uncommon at a very early date for one person to have from 60 to 100 running in the woods. As the region grew more prosperous, the number of hogs possessed by a farmer became one of the indices of his wealth, and the immense droves raised would seem incredible to one not familiar with the facts.[5]

How Hogs Were Fed

Hogs required a minimum amount of care and attention from their owners. During the spring and summer the farmer looked after them only occasionally to ascertain what range they were frequenting and to mark the recent litters by cutting their ears. Every farmer had a separate mark which was recorded in a book kept by the county clerk, and the laws placed very severe penalties on those who cut off the ears or altered the marks of hogs or cattle belonging to others. These marks were, of necessity, very intricate, forming a great disfigurement to the animals.[6] Bears, wolves, and wildcats, not infrequently committed depredations on the herds, but the loss from this source was of too little consequence to induce the farmers to enclose their fields. Wild roots, vegetables, berries, and the native grasses which flourished in great profusion, provided abundant forage during the summer.[7] When these disap-

[4] Porter, Gannett, and Jones, The West in 1880, p. 309.
Prairie Farmer (April, 1842), Vol. II, p. 34. "Pigs are of various sorts," says one writer, "but many are of sandy color and some with wattles, a piece of flesh two and one-half inches thick, growing out of their cheeks."

[5] Robert Baird, in his "View of the Valley of the Mississippi" (p. 207), says, "Many farmers in ordinary circumstances raise annually several hundred hogs, a hundred cattle, and ten or twenty horses."

[6] Hall, James, Notes on the Western States, p. 146.

[7] Faux, Memorable Days in America (p. 228), says, that as consequence of being confined too much on this food, some of which was ill-favored and poisonous, beasts not infrequently died suddenly in the fall. Fordham (p. 221) describes the wild strawberries as so abundant that they dyed his horse's fetlocks like blood.

peared in the fall, however, the hogs often had a hard time finding a living. With the falling of the "mast"—hazel and hickory nuts, acorns, and beech nuts—the hogs throve better, and in a good year fattened rapidly, becoming quite large.

Hogs fattened entirely upon wild nuts, however, even when they became of remarkable size, were not in fit condition for market. Mast-fed hogs produced pork, which, while not deficient in sweetness of flavor for immediate use, was soft, oily, and hard to preserve.[8] Such pork, of course, could not pass inspection at New Orleans.[9] For this reason hogs were driven home in the autumn and fed on corn for a period of from three to six weeks before they were taken to market. During this time, although they did not become any fatter and did not increase appreciably in weight, their flesh became solid and their lard white and firm.[10] Most of the advertisements of pork packers during this period expressely stated that only "good corn-fattened" hogs were desired. The difference in value between the pork fattened in the woods and the corn-fed pork is shown by the scale of prices of the early days. In 1817, $3.50 and $4 were the prices paid respectively for the two grades of pork.[11] The same distinction manifested itself in prices as late as 1837, when mast-fed pork was selling at New Orleans at $3 per hundredweight and corn-fed pork at $4 to $5.[12]

Corn the Later Hog Feed

As the clearing of the wilderness increased the amount of cultivated land, farmers depended less on mast and more on corn to fatten their hogs. The cost of raising corn lessened as the tillable acreage increased, and in a short time corn began to be raised in very large quantities. With this came the

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[8] Faux, Memorable Days in America, p. 259. He adds, "When boiled, the fat became oil and ran out into the water, and the bacon would drip all summer."
[9] Mitchell, Illinois in 1837, p. 42.
[10] Hall, James, *op cit.*, p. 148.
[11] Fordham, Personal Narrative, p. 118.
[12] Mitchell, *op. cit.*, p. 42.

realization that it was more profitable to transform the corn into pork and let it "walk to market" than to carry the corn to some river town for shipment or to distill it into whiskey. As early as 1831, the size and appearance of the hogs at Cincinnati was taken as the index of the corn crop, and packers rejoiced "that the farmers begin to be more sensible than formerly that the best way of disposing of their corn is to use it to increase the size of their hogs, so as to command the highest prices."[13] Mast continued, however, to be an important element in pork production as long as the woods remained. During the season, 1854–1855, "but for the superabundance of mast in the Western States, the deficiency in the supply of hogs would have been still greater than it actually proved to be."[14]

The necessity of proper feeding in order to prepare hogs for market gave rise, in some cases, to a special class of men called "feeders," who purchased the hogs wild upon the range and took them to a convenient place near the market, where they fed them on corn for a period sufficient to put the pork in such condition that it would pass inspection at New Orleans. Another class of feeders engaged in the business, not to provide better pork for the market, but to afford an outlet for an otherwise useless by-product. These were the distillers, who utilized the "mash" of the corn and rye left in the distilling of whiskey as a food for fattening hogs. "Still-fed" hogs constituted, indeed, a not insignificant portion of the whole number marketed in a single year.

Early Emphasis on Weight

Two hundred pounds was considered a very fair weight for a razor-back, although if well kept the same hog might have been twice as heavy. Moreover, it took two or three years for the hog of the wilderness to attain even this weight,

[13] Edwardsville, *Illinois Advocate*, Dec. 23, 1831.

[14] *Alton Weekly Courier*, March 15, 1855. The production of hogs in Ohio was 20 per cent and in Kentucky 30 per cent less than normal.

whereas a hog raised with proper care would have been ready for the market in 18 months. The prices paid by packers were almost universally graded according to the weight of the hog, a heavy animal often commanding double the price per hundred pounds that would be paid for one of light weight. This method of grading pork, which was very different from that which we find in the packing business today, was due to at least two causes. The general supposition was that light hogs were those which had been fed in such a way that their pork was not of the highest quality, and, in the second place, "clear pork," for which the highest prices were obtained, could only be made from the largest hogs.

This pecuniary incentive, coupled with a growing appreciation of the fact that the hogs which cost the least to produce were not the most profitable to the raiser, caused a gradual improvement of the stock. The agricultural societies, which speedily sprang into existence as the counties became more thickly settled, contributed their share to this movement, and in at least one instance a packer sold the farmers a lot of extra fine hogs he had just received instead of devoting them to the knife and barrel. By 1840 the tendency toward improvement of the breeds of stock was very manifest, and another decade witnessed the passing of the hog of the wilderness.

Lighter Hogs Come into Own

One of the most common bits of news in newspapers and agricultural periodicals for many years was a statement regarding the size and weight of some certain animal; or the average weight of a drove of animals, which had just been marketed. This emphasis on size furnishes a good indication of the gradual improvement of the breeds of hogs along lines which would produce a larger animal. On the other hand, this continued mention of the largest animals marketed was, no doubt, one of the means of fostering a healthy rivalry among stock raisers which could not but be beneficial to the industry. The wide

use of lard oil for illuminating and lubricating purposes during the fifties and sixties made the demand all the greater for large, fat hogs. But with the substitution of coal oil for lard oil for the former purpose in 1870, packers began to look forward to a time when but comparatively few very large hogs would be required, and when young hogs of light weights, for the making of hams, light sides, and pickled pork, would be most in demand.[15]

The problem of getting the hogs to market was solved by the farmers in two different ways, the distinction consisting in the possession, or lack of vitality on the part of the hog. Pork was either delivered "on the hoof," or the packer received it already slaughtered and dressed. Butchering was often done at the farm, the neighbors being called in to assist. After reserving a sufficient supply of pork for his winter's use, the farmer would take the remainder to the nearest packing point. Farmers were often not sufficiently careful about allowing the pork to become properly cooled before putting it on the wagons and taking it to market. Such precautionary acts as the fastening of the dressed hog by means of two sticks, so that the air might have free access to all exposed portions of the carcass and prevent a tainting of the meat by aiding in the rapid removal of the residual animal heat, were frequently overlooked.[16] Home-dressed pork was not likely to be as carefully cleaned as that slaughtered in the city, and even if in good condition at the start of the journey, it could not be taken very far without getting more or less dirty. The carcass was sometimes cut in the wrong places owing to the farmer's ignorance of the exact methods employed by the packers, and if the pork was brought to town in cold weather, it was pretty certain to be frozen, a condition which packers especially wished to avoid. For these reasons, as well as for the fact that the bad roads and long distances often greatly reduced the farmer's

[15] Transactions of the Illinois State Agricultural Society (1870), Vol. IX, p. 97.
[16] *Union Agriculturist and Prairie Farmer* (Nov., 1841), Vol. I.

profit, the practice of taking dressed hogs to market for the use of the packers gradually declined. At Cincinnati, for example, in 1826, the total number of "wagon hogs," as these were called, was estimated at 25 per cent, while in 1843 the number was less than 10 per cent of those brought to that market.[17]

Driving Hogs to Market

The method usually employed of getting hogs to market was to drive them there. The great difficulty in driving hogs in the wilderness of the earliest days probably somewhat retarded the growth of the stock raising industry, and the long distances to the market certainly prevented any but the very strongest hogs from making the journey.[18] The active life of these wilderness animals, however, made them just the kind which could undergo the fatigue of the journey without too great a loss in weight. The fattening bestowed on these hogs only enabled them to run so much the faster. The sluggishness, which is the characteristic of the carefully bred hog of today, was the one quality to which the wilderness hog never could lay claim. Whenever animals were wilder than usual they were enticed into a pen, and after being caught their eyelids were "stitched." Although thus blinded, the hogs were able instinctively to keep to the road, and upon reaching their destination a clip of the scissors set things right again.[19] Two or three days on the road made the hogs quiet enough to be driven along the highway without much trouble, 8 or 10 miles being the average day's journey. Farmers with large droves often took their own hogs to market, while small farmers generally united their droves for safety and convenience. But by

[17] Drake and Mansfield, Cincinnati, in 1826 (p. 77) say that in the three months between Nov. 15, 1826, and Feb. 15, 1827, 40,000 hogs were packed at Cincinnati, of which 10,000 were country killed. At Cincinnati in 1834–1835, only 10,000 out of a total of 162,000 hogs packed, were "wagon hogs." (*Alton Telegraph*, Feb. 3, 1836.) The *Alton Telegraph*, Feb. 25, 1843, states that 25,000 out of a total of 233,987 hogs packed at Cincinnati were slaughtered by the farmers and brought in wagons to that city.

[18] *Union Agriculturist and Prairie Farmer* (1841), Vol. I, p. 5: "Hogs to travel well should have a straight hind leg, with muscle large and full, quite down to the hock or knee joint. With this shape any hog that is free from bruises will travel the required distance."

[19] History of Madison County, Ohio, p. 473.

far the largest number of hogs were brought to market each year by drovers, who constituted a special industrial class created by the necessities of the trade. In good years this was a very profitable business.

These drovers who took cattle also across the Alleghenies from the Ohio Valley, drove large numbers of hogs to eastern markets. Some of these drovers had as many as 5,000 hogs. An estimate puts the number of hogs annually driven east from Kentucky at over 100,000.[20] Some of these drivers from Kentucky went into Virginia, the Carolinas, and Tennessee. In 1828 the value of livestock passing the turnpike gate at Cumberland amounted to $1,167,000.[21] With the rise of the pork packing industry of the West, however, the necessity for droving over such long distances ceased.

Early Improvements in Cattle

The earlier efforts of American farmers after the Revolution and in the first decades of the nineteenth century to improve the breeds of cattle have been mentioned. Although some cattle were imported in 1783 and 1785, they were not of a highly developed breed, for the English Shorthorns were hardly in existence then and the fame of the Devons and Herefords was local. The Patton stock of Maryland, Virginia, and Kentucky represented two kinds of cattle, one of them the "beef breed," which was an early example of Shorthorns, the other, "the milk breed," representing the Longhorns. These attempts, however, were made by enterprising and far-sighted individuals.

It was not until after the War of 1812 that increased and general attention was given to stock raising all over the United States. In Massachusetts the Society for Promoting Agriculture offered a premium for a thoroughbred Shorthorn bull. As a result one was brought over in 1817. The same year

[20] Turner, Rise of the New West, Chap. VII, p. 101.
[21] Emigrants and Travellers, Guide to the West (1834), p. 194, quoted in Turner, *op. cit.*, p. 101.

Colonel Sanders of Kentucky imported a few cattle, some of which were Shorthorns. These had a great effect on stock raising in Kentucky and Ohio. Henry Clay imported some Herefords and these also attracted great attention. From this time on importations from England became common, and certain men acted as regular importers. In 1824 Mr. Powell of Philadelphia began this work of importation, being the first systematic breeder of Shorthorns in the United States. Much of his stock was sold to Kentucky and Ohio farmers.

Importing English Cattle

In Ohio, which was now the great cattle raising state, the cattle men took advantage of the situation, and in 1834 Governor Allen Trimble, together with Renick and General Duncan McArthur, formed the Ohio Company for importing English cattle, and $9,200 was subscribed in $100 shares. Agents sent abroad brought back 19 Shorthorns and each year the herd was increased, until in 1836 it was sold at public auction, the first thoroughbred cattle sale ever held in America. When the company affairs were wound up a dividend of $280 per share, totaling $25,760, was declared.[22] Very great benefit had resulted from this introduction of English Durham stock and crossing it with the common stock. Some of the full-blood bulls and cows were sold into other states and the whole stock of cattle in the West was thus improved.

With regard to the Herefords, Clay's example was followed by Admiral Coffin, who sent a bull and a heifer of Hereford stock to the Massachusetts Society for Promoting Agriculture. In 1840 a large importation was made by New Yorkers, but Herefords failed to catch the popular fancy as had the Shorthorns.[23]

It was in the middle of the nineteenth century before many Devons were imported. Robert Patterson of Baltimore

[22] U. S. Agricultural Report, 1851, p. 98.
[23] Thompson, Chap. IX.

became an extensive breeder of Devons, and the Massachusetts Society for Promoting Agriculture also imported a herd. In New England, Devons, through cross-breeding, supplied the best beef of the Boston market, the consumers of the best beef produced in America. In the fifties Ayrshires and Jerseys were imported when dairying became an extensive activity, and a little later the Kerries were also imported, but these were not so important as beef animals. The earliest Holstein herd came after 1860.

Beef and Dairy Cattle in 1860

From this survey it is clear that by the end of the Civil War the beef and dairy herds were distributed where one would expect to find them—the beef cattle, chiefly Shorthorns, in the Ohio region and westward, the dairy cattle in the Atlantic states.

At this period the breeding of beef cattle was chiefly confined to well-to-do gentlemen farmers, or to a few professional stock raisers who were able to command considerable capital, as in Ohio. Much good resulted from their efforts, though there was too much breeding, and due to the "battle of the breeds" and lack of foresight the opportunity was lost to develop a distinctly American breed.[24]

Growth of the Beef Belt

Professor James Westfall Thompson has pointed out in his admirable work on the history of stock raising that during the period, 1830–1860, it became evident that there was a definite belt or zone of territory corresponding broadly to the 40th parallel of latitude which affords the best facilities for cattle feeding.

> If one starts at Portland, Maine, and comes south by way of Boston, Hartford, and Harrisburg, he finds a gradual improvement, while the quality culminates to perfection in the vicinity

[24] See Year Book of Department of Agriculture, 1899, article by John Clay, veteran Chicago stockman, "The Work of the Breeder in Improving Livestock."

of Philadelphia. From Philadelphia westward, whether coming by way of Wheeling, Columbus, Indianapolis, Springfield and so across the Mississippi or by way of the Mohawk Valley and Lake Erie, one finds the same perfection of quality.

In this belt, experiments proved that cattle pastured there fattened in less time and mixed their lean and their fat, or marbled their flesh, much more fully and evenly than cattle raised elsewhere. North of this zone the intense cold caused unprofitable consumption of provender in order to preserve the required amount of animal heat, and the beef was of poor quality, dark in color, and with little or no admixture of fat and lean. Montreal beef is an example. South of this zone, beef, it was found, became stringy and the fat became tallow, not being interlarded with the flesh, but in a solid layer composed of fat only. All southern beef shows this quality.

This zone Professor Thompson labels the "American Beef Belt." At its widest part this belt lies between the 36th and 43rd parallels and extends west to the 100th meridian, i.e., to the edge of the great plains in central Kansas and Nebraska.

It was, however, not until 1840, or thereabouts, that this zone and its superiority in the production of beef animals was well recognized. A writer much given to praise acknowledged that prior to 1840 the "neat cattle" of the West were inferior in size to those of the older states.[25] This was due, he claimed, entirely to bad management. The cattle of this region were not penned up in pasture fields, or housed, but suffered to run at large "on the commons." In Ohio the cattle were simply fed twice a day, in open lots of 8, or 10, or more acres, each lot provided with unhusked corn for fodder, and following the cattle came hogs to clean up.[26] Hence all the calves had to be preserved without regard to quality "in order to entice the cows home at evening." Food was scanty enough in the autumn, yet not infrequently a herd of, possibly, a hundred cattle would be left all winter to pick a precarious existence in

[25] Peck, Guide (1836), p. 282. Guide, 1837, p. 287.
[26] Census (1860), p. cxxix, Cattle and Cattle Trade of the West.

the open. Such treatment could not fail to produce stunted cattle.

Occupations in Cattle Industry

With the great subsequent development of the stock raising industry within the Beef Belt it was natural there there should arise a differentiation of activities in the business. Hence, the cattle industry in those early days comprised at least five different occupations. First, there was the raiser of cattle or "stock raiser" who sold the animals at the end of one, two, or three years to the "grazer." Cattle raisers, during the forties and fifties, were found chiefly on the great prairies of Illinois, Missouri, and Iowa, and they carried on the business on such an extensive scale that it was said that a farmer called himself poor if he had not a hundred head of cattle about him.[27]

The grazers, during the earlier decades of the industry, were very largely the owners or renters of the great pasture lands in such counties as Madison, Fayette, and Union, in Ohio. After the Civil War the raising of cattle began to be carried on more extensively in the states farther west, and in time the business of grazing came to be one in which the farmers of a state like Illinois, for example, engaged almost exclusively. After the cattle had been allowed to graze all summer they were taken over in the fall by the cattle feeder, or "stock feeder," the raiser of corn, who fattened the cattle for market in the Atlantic cities. Cattle were also sometimes fattened at the distilleries on the waste mash.[28] As the raising of cattle came to be confined more to the prairies farther west, the great corn crops of Illinois were utilized to a greater extent in the work of feeding the cattle for their final fattening, just before marketing them. The cattle were purchased in the fall from the states west of the Mississippi and were brought to Illinois to consume the crops of corn during the winter. Likewise, in

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[27] Peck, Guide (1836), p. 282.
[28] *Alton Courier*, Mar. 29, 1853.

the spring cattle were imported to consume the grass on the pasture lands.

Another functionary was the drover, who was especially prominent after the feeder had completed his work. He took the large herds from one part of the country to another, and ultimately conducted them across the mountains to their final market. After the advent of the railroads the drovers' business languished to a very great extent. Last of all of the occupations in the industry was the banker who supplied the funds.[29]

Cattle Distribution by States

The discussion of the breeds of horned cattle and methods of marketing leads naturally to a survey of the numbers at the end of this period. The total number of neat cattle for this period is thus noted:

In 1840	14,971,586
In 1850	18,378,857
In 1860	25,640,337

Taking the total number and comparing it with the total population for these years we find that in 1840 for every 100 people there were 87 head of cattle, in 1850 there were 79, and in 1860 there were 81 head of cattle. The ratio of cattle to population therefore was 80 per cent.

Coming to the subject of distribution of cattle, Dr. Silas Loomis, who made a special study for the federal government in 1863, gives some interesting data. He divided the states into three classes, viz., minimum, medium, and maximum. The first class included the states having less than the normal requirements of 80 per cent; the medium class those states having between 80 and 100 per cent and the maximum those states which had over 100 per cent. We shall consider the distribution at the beginning of each decade.

[29] *Prairie Farmer* (Oct., 1849), Vol. IX, p. 305.

Cattle Distribution in 1840

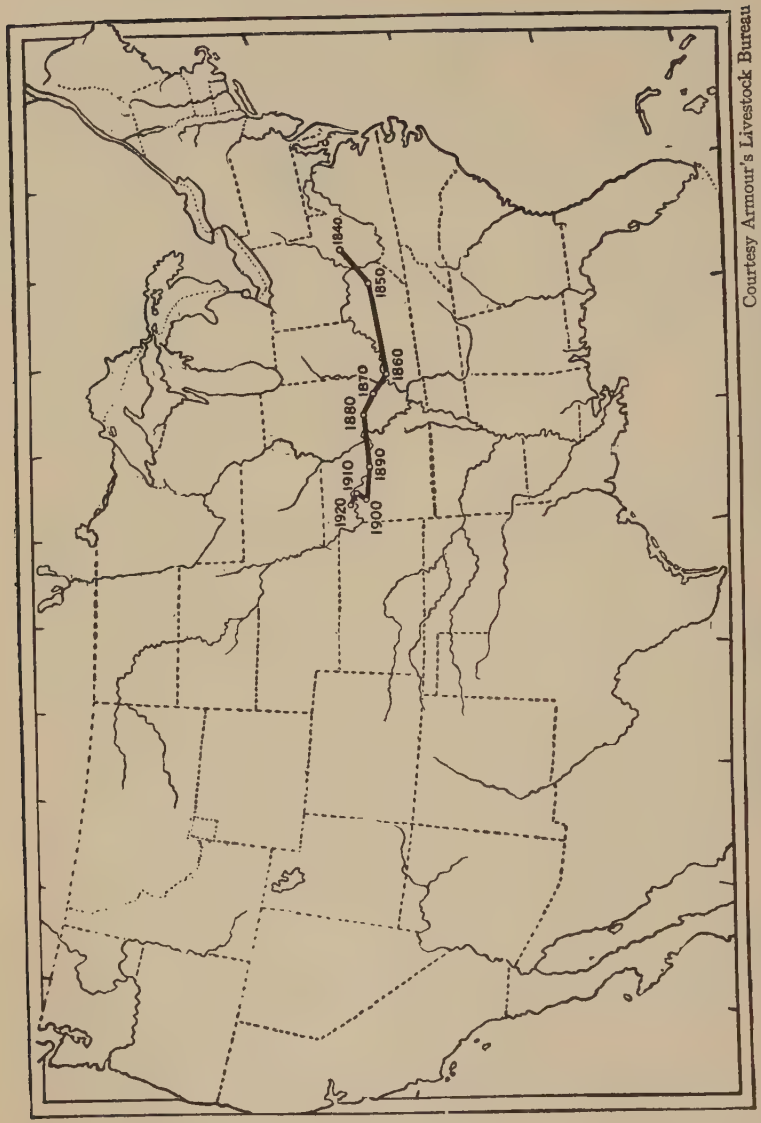
The general distribution of cattle in 1840 is plainly evident from this study. In the East cattle were by far too few in proportion to the population, except in Vermont and New Hampshire. In the Ohio Valley conditions were better balanced. In the Far West of that time the number of cattle was much in excess of the needs of the people. The West had nearly three times as many cattle as the East in proportion to the number of inhabitants. The greatest deficiency was in Massachusetts and Rhode Island. The greatest excess was in Florida and in Arkansas, where the ratio was six times as great.

Cattle Sources in 1850

By 1850 the western limit of the minimum class of states had moved westward from the Potomac and Monongahela rivers—its position in 1840. The western edge of the minimum group had advanced at least 500 miles, and now commenced at the southern boundary of North Carolina and followed the southern boundary of Tennessee to the Mississippi. North of the Ohio River, Illinois was the only state of primary rank as a cattle raising state east of the Mississippi.

The medium class in 1850 was represented only by Alabama in the South and New Hampshire in the North. At the same time Massachusetts dropped from a low 35 per cent to 24 per cent, and Rhode Island from a low 38 per cent to 26 per cent.

The maximum class in 1850 occupied the same position as it did in 1840, with the exception of Alabama; but those states lying east of the Mississippi declined from an average of 145 per cent in 1840 to an average of 115 per cent in 1850. In the same interval also the states west of the Mississippi made remarkable increases of ratio, from an average of 131 per cent in 1840 to 159 per cent in 1850. As might be expected, Texas heads the list with 438 per cent.



Courtesy Armour's Livestock Bureau

Figure 2. (b) Map Showing Change in Center of Cattle Production, 1840–1920

Cattle Distribution in 1860

From the data afforded by the years 1840 and 1850, and the deductions derived from them, the student of statistics might pretty accurately forecast what the distribution of cattle in the United States would be in 1860, anticipating the census of that year.

In 1860 the minimum class of states remained nearly the same as in 1850. South Carolina by this time had fallen into a minimum condition, while Indiana had partially recovered and climbed into the medium class.

The medium class contained many of the states which in 1850 were in the maximum class. In the South were Georgia, Alabama, and Mississippi; in the West, Indiana, Illinois, Missouri, and Kansas; in the East, New Hampshire—each containing between 80 and 100 per cent. It is evident that in the ten years between 1850 and 1860 cotton steadily drove out cattle in the southern states. So far as the North is concerned the notable facts are the rise of Indiana from its former minimum status, and the drop of Illinois and Missouri from first to second place.

In 1860 all the maximum group of states were west of the Mississippi, with the exception of Vermont and Florida at the northeast and southeast corners of the Union. These states were Kansas, Nebraska, Arkansas, Texas, California, Oregon, and Washington. The greatest diminution of this decade was in South Carolina, which dropped 44 per cent. Louisiana lost 35 per cent and Mississippi 30 per cent. On the other hand, the greatest increase was in Texas, California, Indiana, Iowa, and Minnesota.

Cattle Sources North and South

From these figures and a comparison of them it is evident that when the Civil War broke out the chief, almost the only, cattle source of the North was in Indiana and Illinois, and in the new states in the middle border; while the South had two

sources in Florida and Texas, both of which states contained huge surpluses of cattle. The states on the Pacific Coast, of course, were too far removed to be of any value to the North, no matter how great their loyalty to the Union was. The same statement probably would be true of Texas in relation to the southern Confederacy. Considering the lack of railroads in that part of the South when the war came, and in addition the two other facts that federal war vessels blockaded the Gulf Coast and federal monitors patrolled the line of the Mississippi River, it is doubtful if Texas was any material source of cattle supply for the people of the South during the great conflict.

CHAPTER III

CENTRALIZED CASH LIVESTOCK MARKETS

Distribution and Marketing

Discussion of the distribution and movement of cattle brings up the whole subject of the marketing of livestock and the development of the great livestock markets. As the essentials of the modern institution of a cash market grew up in the period before the Civil War, it is well to consider the problem at this point.

The methods of the early days in Ohio and Illinois were simply those of Pennsylvania, Virginia, and New England under similar conditions in an earlier period. The same terms were used in the West as in the East, e.g., the distinction between "stock feeders" and "stock raisers" was established in Lancaster County, Pennsylvania, shortly after the Revolution.

The earliest cattle markets were centered in Boston, New York, and Philadelphia. The Boston one became located at Brighton, now a part of the metropolitan area of Greater Boston. Just when the famous Brighton Cattle Market was started is unknown. The originator seems to have been Jonathan Winship, who died at an advanced age in 1820. The following account of its development is of interest [1] and shows the very close connection between the livestock market and the slaughtering industry even in that early day.

Brighton Cattle Market

Being a contractor with the English government for beef for the army, and owning a large tract of land where Brighton

[1] "Brighton Cattle Market," *Country Gentleman* (1860), Vol. XVI, p. 100.

now stands, Mr. Winship established a large slaughter house there, and producers of beef cattle soon began to find their way to this place to effect a sale. Other butchers came here to compete with him in making purchases, and in a short time the business became centered here, Mr. Winship having wisely encouraged and fostered it. This is believed to have occurred at the time of the old French War (1756) or very soon after. From that time this was the cattle market of New England, and soon after the butchering business also began to center there.

Following the Revolution the business increased rapidly for twenty or thirty years, at the end of which time there were often as many as 5,000 beef cattle sold and slaughtered in a week. Most of the beef was barreled and salted, but the building of railroads had nearly destroyed that branch of the business. The increase of population caused a corresponding increase in the demand for fresh meats, but the aggregate number of animals slaughtered was much less than when beef was barreled there.

Old-Fashioned Cattle Selling

Brighton Market was the model for many others in the East and later in the West. It continued its importance until the rise of the dressed beef industry in the seventies and eighties. As an example of the old-fashioned market institution, which was the forerunner of the great modern centralized livestock market, a writer in the *Country Gentleman* in 1860 thus described it:

> Thursday of every week, which by common consent and custom is the market day, changes the generally quiet village of Brighton into a scene of bustle and excitement. At early morning the cattle, sheep, etc., are hurried in and soon the morning train from Boston, omnibuses, carriage and other "vehicular mediums" bring in a throng of drovers, some from as far away as Maine, buyers, speculators and spectators; so that, by 10 o'clock, there are generally gathered as many as two or three

hundred vehicles in the area fronting the Cattle Fair Hotel. The proprietors thereof throng the spacious bar-room for the purpose of warming themselves in winter, and in summer "cooling off"—the process for effecting both results being precisely the same. The portico of the hotel is occupied by hawkers and peddlers, who sell clothing, jewelry, soap, watches, knives, razors, etc. (to say nothing of their customers), at astonishingly low rates. An "English hunting lever eighteen carats fine," is frequently sold for five or six dollars, and, of course, is a genuine article. In the region round about "Mammoth Steers," "Living Skeletons," "Snakes," etc., are on exhibition at reasonable prices.

All morning the butchers and the drovers are busily engaged in their traffic. The fattest and best of the cattle in the pens find a ready sale, and long before all the drovers are in, select lots begin to be driven from the grounds. Men and boys hurry up and down the lanes and through the pens, each armed with a stick which is a sort of a shillalah, shouting to the half-crazed cattle, and with screams and blows directing them where they should go. Occasionally a drove of cows and calves come along, the latter muzzled, and the former looking and bellowing in chorus to the shouts of their drivers. Farmers from the neighboring towns are selecting "stores" from the large number of that class in the pens, and dairymen carefully examining the "milky-mothers" that are so anxious, seeking their young from the midst of their companions. Working oxen are driven in by the farmers from the vicinity, who sell, only after much banter, to buy again when prices are low. In the midst of these, dogs and goats and mules are offered for sale, and near by, are the hog pens, containing, at this season, only stores, which are sold singly and in pairs to small farmers, mechanics and others who think they can afford to "keep a pig."

The forenoon is busy enough. At high noon the huge bell of the hotel announces dinner, and for a brief period there is a breathing spell for man and beast. After dinner, business again resumes its way. The voice of the hawker becomes hoarse, but it is by no means silenced. Drovers who have not made many sales get nervous, and pens are cleared out without much regard to profit on the part of the seller. The butchers begin to turn their faces homewards, and the drovers, generally with well-filled wallets, start for Boston. A few, not liking the prices, and hoping for "better times," make arrangements to turn out their cattle to pasture, and hold over to another week. By five o'clock

the business of the day is over, and Brighton subsides once more into a quiet, matter-of-fact Massachusetts village, till another Thursday brings round another market day.

Western Cattle and Eastern Markets

With the continued growth of population, urban and rural, in the seaboard states there came an increased demand for beef and pork. This demand was met by the surplus from the new cattle and hog raising region of the Ohio Valley. Indeed, an English traveler who visited Ohio in 1818 described the prairies as "filled with herds of cattle for the Philadelphia and Baltimore markets."[2] These cattle reached the eastern markets by being driven there. The history of the rise and decline of Ohio droving is a short but interesting chapter in the history of the New West. At least as early as 1805 Kentucky and Ohio cattle raisers began to drive cattle to Philadelphia and Baltimore.

This was the economic situation. Ohio even when almost a wilderness grew very large crops of Indian corn with but little labor. However, transportation was bad and markets too far away for profit. Since the corn itself could not be transported, it occurred to Felix and George Renick, a couple of recent emigrants from Henry County, Virginia, that the corn could be fed to cattle and the cattle could be driven east, yielding a profit both in corn and cattle. The Napoleonic Wars in Europe kept up the price of corn, so that the most profitable days of Ohio droving were between 1805 and 1815. It was in 1805 that George Renick drove the first lot of fat steers from the Scioto Valley in Ohio over the Allegheny Mountains to a seaboard market at Baltimore.[3] In this way

[2] Quoted in Thompson, Chap. IX.

[3] U. S. Agricultural Report, 1849, p. 298.
It is interesting to note that the first cattle ever driven from Illinois to eastern markets were taken to Philadelphia by two Renicks of another generation, Seymour and Felix Renick, in 1838. The cattle not only held their flesh but were in better condition when they arrived than when they started. The Renicks were advised in Philadelphia not to make known the fact that they had driven the cattle from Illinois, but they insisted on putting them on the market on their merits and with satisfactory results. The prejudice which had to be overcome reminds one of the later ignorant prejudice against western dressed beef. (*The National Livestock Journal*, Vol. VI, No. 8.)

was started a competition in meat production between eastern and western farmers, which increased to such an extent that it practically drove the eastern farmer out, not so much because conditions favored the West as because of the relatively inferior equipment of the eastern farmer.[4] This drove of the Renicks sold at a net profit of $31.77 per head.[5] At first the cattle were taken to plantations on the Potomac to fatten for the Baltimore and Philadelphia markets, much as in later times the cattle of the great plains were brought to the feeding grounds in the Corn Belt of Kansas, Nebraska, and Iowa, but about 1830 the feeding grounds shifted into Ohio.

Cattle Droving to New York

In 1817 the first western cattle, 200 in number, were taken to New York from Chillicothe by a drover named Drenning. DeVoe states that according to the New York press "they appear just as fresh as if taken off one of our Long Island farms. When it is recollected that they have been driven nearly one thousand miles, this fact will be considered a very remarkable one."[6] From this time on droving to New York was just as common as to Philadelphia.

Two grades of cattle were driven east. First, the three-year-old steers, called "stock cattle," were driven to eastern Pennsylvania where the farmers bought them and fattened them for market. Second, fat four-year-old bullocks were driven more slowly and sold directly to the butchers.

Livestock Routes from the West

From Ohio there were three principal routes: first, the northern road by way of Erie, Pennsylvania, and Dunkirk, New York, and thence down the Mohawk until after the construction of the Erie Canal in 1825. And right up to the

[4] *The National Provisioner* (Feb. 24, 1906), Vol. XXXIV, No. 8.
[5] Cattle then sold at $25 per head for cattle measuring a fixed number of feet around the belly, and $1 was added or subtracted for every inch over or under this measurement. (Melish, Travels, p. 481.)
[6] DeVoe, The Market Book, p. 411.

coming of railroads live cattle were usually driven, meat, lard, pork products, etc., being shipped by boat. Second, the road crossing the Ohio River by ferry at Wellsville, and leading to Philadelphia via Pittsburgh. When the Pennsylvania Railroad was completed, Pittsburgh became a stockyard center to which the cattle were shipped east by rail. Third, the more southern road following the old Zane's Trail from Zanesville to Wheeling and thence either through Bedford, Pennsylvania, to Philadelphia, or through Cumberland, Maryland, to Baltimore. These three routes are practically the same as those of the New York Central, the Pennsylvania, and the Baltimore and Ohio railroads today.

The following description, by Professor Thompson, of the droving and its setting brings the picture vividly to mind:

> Along these roads were "drove stands," inns, or rather big farmhouses where the drovers lodged, surrounded by cattle pens and corn cribs. The crew of drovers comprised a boss, often the owner of a herd, a man to ride along each side, and another to lead. The last led an ox as a sort of bell-wether for the herd. The Centreville whip was a famous weapon for these drovers. It was originally manufactured by a harness-maker there and attained great fame. These whips had linen or silk "crackers" and the report of them was like a rifle shot. The hired drovers received $15 per month, and had to walk home. It was the rule to allow thirty-three miles as a day's walk. Fast walkers made forty. In this way, in five days, a man might make an extra half dollar plus another fifty cents which he was allowed for board and lodging.

Droving a Seasonal Business

It should be noted that this droving was seasonal. The great bulk of cattle arrived at the eastern markets between the middle of April and the first of August. None came in the spring and fall from the West. There was not the continuous flow that there is today.

The cattle trade of the Scioto Valley increased greatly until 1850, in spite of the opening of the New York and Ohio canals,

which gave the Ohio farmer access to a better and more reliable market enabling him to sell for cash, but at better prices. The completion of the great through railroads added still further to the farmer's resources. They made it possible for him to diversify his farming, and they aided in bringing the corn feeding of cattle to the highest point. From 1850 to the Civil War the whole number of cattle corn-fattened may not have declined much, owing to the increase in home consumption and the extensive barreling. However, the number sent to eastern markets certainly fell off.

Middle West Cattle Sales

As a result of the separation of the functions of stock raiser and stock feeder there developed in the West a better business organization to govern the cattle industry. The most important institution that grew up was the cattle sale, and the most typical of these was the one in Madison County, Ohio. This monthly or quarterly sale, or "market fair," had long been established. On the sale days, the grazier, feeder, and seller bought their fattened animals, and the butcher came to make his purchases both at auction and on private terms. It was a valuable system.

The same custom on a more picturesque scale was seen in Kentucky at Paris in Bourbon County. A monthly court on the first Monday of the month brought the planters and stockmen together at the county seat, whence came the idea of having at the same time a general sale and purchase of livestock. Northern men met southern buyers. In an article entitled "Court Day in Bourbon" this middle west forerunner of our great centralized markets is described:[7]

> As we said, other counties have their court-day fairs, but Bourbon claims precedence over them all; and tell a Bourbon man that they had a good attendance at Lexington, Versailles, Frankfort, or Georgetown, on such a day, and he will contemptuously throw

[7] *Country Gentleman* (1856), Vol. VIII.

it aside with a "possibly—but it is not a circumstance to Bourbon!" On this day numerous drovers of mules, asses, and the horses of the riders, a little after the courthouse clock had struck eight, began to thread their way into town. As they were driven in, the several squads of animals were gathered into little paddocks which are enclosed at the foot of the hill just below the courthouse, preparatory to being brought on to the "square" for exhibition and sale. Now, this square is a little huddled-up place, fronting on the main street, containing two or three acres, in the center of which is the courthouse, with its wings of county offices, and around it some posts and a railing to which every rider as he comes into town on horseback "hangs" his horse—pretty much everybody coming in on horseback, by singles, couples, and squadrons, as they may or may not fall in with each other when issuing through the gates which lead out from their several farms and enclosures; for few people out of the towns live on the road, and a great majority of them pass through one or more farms belonging to others to reach the highway. By half-past nine o'clock the streets around the square are pretty well filled with people; a few pedlar's wagons containing harnesses, saddles, bridles, halters, etc., are stopped in front; a dozen or more auctioneers are in attendance, on horseback, ready for their work; and then the cattle, mules, jacks, jennys, horses, sheep and swine begin to gather in from the highways, or the paddocks below.

Noisy Cattle Auctioneering

And now commences such a hubbub, and shouting, and auctioneering, but each in its own well known department, as is seldom or never known out of this aforesaid Paris. The buyers from the neighborhood, the adjoining counties, and the adjacent and distant States are all there looking for what they want, and finding it, intent on making bargains. The stock-sellers, knowing quite as well what they are about, put their droves into the hands of the auctioneers, and in a few minutes a dozen tongues are laboring with might and main in crying their sales, and "throwing away bargains"—each one in the midst of the beasts, which are awaiting the fall of his decisive hammer. One would think that in this confusion worse confounded of a dozen droves of mules, half as many of cattle, and scores of single horses all mingled in the multitudinous mass, no one would know his own. But the men in charge are up to it, keeping their beasts in compact knots, and rarely missing one from his fold, each of which

seems to know its companions as instinctively as a brood of chickens do their mother. For two or three hours lot after lot is struck off, and as the sales are made, driven back into the paddocks till the bargains are settled, and the exchanges duly made.

By one o'clock the sales are chiefly over. The tavern dinner bell rings, and the assembled crowd adjourn to the tables. The inner man refreshed, the remaining unsettled business is closed up, the purchasers take possession of their new stocks, and by three o'clock in the afternoon hundreds of horsemen are seen mounted and wending their way out of town singly or in squads as they came in, while a few, perhaps, not selling their stocks to their mind, are seen with their men driving them back to their homes. In another hour the town of Paris is as quiet as if hardly a stranger had appeared in its streets, and transactions to hundreds of thousands of dollars in amount have all been settled and secured.

A gentleman conversant with the business of court-days, told us that he had frequently known the bonafide transactions of the day to amount to more than $250,000. Stock is usually sold at two to four months time, on bankable notes, payable either at home or in the eastern cities. Cattle buyers from New York, Pennsylvania, and New Jersey are frequently there, mule buyers from the same States, Maryland, Virginia, the Carolinas, and Louisiana, while much stock goes back into the same neighborhood from which it is driven to different owners, who still feed and further improve it for a future court-day sale.

This way of doing business we like. It brings every farmer and stock-dealer right up to the mark. The true value of stock is thus well known, men know what they can give and pay it. Others know what they can afford to take, and sell. The business is done up, and no whining or jockeying about it. Yet men are not obliged to sell, if prices rule too low. Sometimes on a dull day, sales are withdrawn and private negotiations effected: but when parties are in earnest, the sales are all made under the hammer; and a prompt way it is. If our New York farmers could have their stock sales at central points, we believe it would be greatly to their advantage; but as they have smaller farms than in Kentucky, and deal in a smaller way, it may be sometime before they adopt it. Yet they must ultimately come to it, as we get our farming systematized, and the proper division of agricultural labors arranged. It will be long before our farmers can individually cope with those of central Kentucky

in the number and value of their herds, but there is no good reason why they should not adopt a custom so useful in the sales and purchases of their marketable stock.

Decline of Cattle Fairs

These fairs, which were very important, declined in the course of time, partly from want of system and energy on the part of the originators, partly because of the growth of population in certain centers, and finally because of the development of transportation, making necessary modern large-scale livestock markets.

With the passing of time, Cincinnati, Buffalo, and Albany rather than Philadelphia were the points where the greater part of the surplus supply of livestock from Illinois and other middle west states was collected.[8] Indeed, by 1860, beef cattle from Iowa were often brought up and driven over to Illinois for fattening and then sent east. The records show that Illinois got the credit for these cattle, a fact complained of by the Iowa raisers.[9]

In cities like Cincinnati, for example, which were then the great collecting points for the business of droving, and in a great many small river and county towns, there were often slaughterers who bought the beeves offered, and who either salted the flesh in casks or barrels or sold it to supply the demand for immediate local consumption. Most of the dealers, however, bought the offerings and drove them to markets nearer the Atlantic seaboard. A very small proportion of the cattle raised in Illinois were killed and packed there.

Less Hog than Cattle Droving

On the other hand, most of the hogs raised in the state were killed at the nearest packing point. The reason for this is clear. Hogs suffered much greater shrinkage in weight and deterioration in the quality of their meat as the result of an

[8] Annual Report, U. S. Bureau of Animal Industry, 1885, p. 376.
[9] *Country Gentleman* (1862), Vol. XX, p. 356.

overland journey, than did cattle or sheep. Moreover, pork when cured and pickled was a much more marketable product than either beef or mutton, which had been similarly prepared. For this reason, during this entire period the packing of pork was so vastly more important than the packing of beef or mutton, that there were many places where the packing of pork was the only packing carried on. At Cincinnati in 1826, it was noted that "among exports, beef formed a smaller portion than would at first be supposed." The prediction that "the greater facility for raising cattle and the high price of beef in other places were such that it might easily be rendered a large and profitable article of export," was never fulfiled; cattle were raised in increasingly large numbers, but almost the entire crop was driven across the mountains each year to the great seaport cities.

The farther west we go from Cincinnati, however, the larger was the proportion of beeves killed and packed in the same region where they were raised. A much larger amount of beef was packed at Alton, Illinois, in proportion to the amount of pork packed there, than was packed at the great Ohio "Porkopolis." And in Missouri, which was so much farther from the seaport that the driving of cattle overland to the market did not appear feasible, "vast herds were raised on the Western border of the state and thousands were there slaughtered, and the meat salted and exported by way of New Orleans to the eastern states or to the West Indies.[10]

Beef Packing Important

It must not be thought, therefore, that cattle assumed no importance in the packing industry. Such an idea is very far from the truth. With each succeeding year the business of beef packing in the West increased, and in spite of an attempt to concentrate this business at Cleveland, Chicago soon became recognized as the center for this part of the packing industry,

[10] Baird, View of the Valley of the Mississippi, p. 207.

and did a very large business in this line, as compared with that done in the other cities of the West.

Between 1830 and 1850 the consumption of livestock grown in the Ohio basin had enormously increased, both in the East and in the South, on the one hand as a result of driving the cattle and hogs to Baltimore, Philadelphia, and New York, and on the other, by floating live cattle and hogs, and ham, bacon, etc., down the Ohio and Mississippi rivers to southern markets. During this period the South gradually devoted itself more and more exclusively to cotton growing, and the East became increasingly industrial. Both sections began to depend in greater degree on the Ohio country for produce and livestock. This double condition magnified in large measure the stock raising and meat packing industry in Ohio, Indiana, Illinois, and Kentucky.

Until the Civil War the states in the Ohio basin had a monopoly control over both East and South. They had a choice of markets. For example, Cincinnati, which was centrally located at the junction of the water routes to both the Atlantic and the Gulf coasts, profited enormously from the competition between the eastern and southern markets for the produce of the Ohio Valley. Indeed, the merchants of Cincinnati found their most important markets toward the south.[11]

This active north and south trade soon made eastern merchants desire a large share of western products and they began in the late forties and the fifties by steamboat navigation to neutralize the effect of the natural waterway communication between the Ohio Valley and the Gulf.

Connecting East and West

Of course there had been means of communication between

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		To New Ohio	Other Down-River Points	Up-River Points	Flat Boats	By Canals and Railways
Beef	(bbls.)	19,319	68	314	1,611	236
Lard	(bbls.)	22,854	117	3,277	1,821	4,143
"	(kegs)	56,380	5,358	5,739	1,587	2,823
Pork	(bbls.)	112,622	1,055	3,801	3,781	4,608
"	(lbs.)	1,345,860	755,860	1,559,280	525,820	1,092,953

(DeBow, Vol. I, p. 253.)

East and West in canals and turnpikes facilitating movement of livestock and meat products, but they now had to be supplanted by steam power. Hence began the building of railways to connect the East and West as cheaply and readily as West and South.

By 1842 the Boston and Albany Railroad connected near Albany with the Erie Canal and another road had been built to Buffalo. The Philadelphia, Wilmington and Baltimore, the Philadelphia and Reading, and the Baltimore and Ohio to Cumberland were all in working order, and by 1851 the Erie Railroad was opened from the Hudson to Lake Erie.[12]

In the fifties the trunk lines were rapidly completed. The construction of the Lake Shore and New York Central Railroads between northern Ohio and the seaboard at New York and Boston, the building of the Pennsylvania Railroad between Pittsburgh and Philadelphia, and the Baltimore and Chesapeake Bay, each of them identical with one of the three pioneer routes to the West, gave the western farmers far greater accessibility to the markets of the East than before.[13]

The importance to livestock development of this building of railroads is summarized by Professor Johnson as follows:

> The transportation of livestock from the grain-belt to the eastern states was taken over almost entirely by the railroads. Neither the Erie Canal nor the Pennsylvania Canal had carried many hogs and cattle, though large quantities of meat, lard and other animal products had been sent to the eastern cities over both these routes. After the rise of the pork-packing industry at Cincinnati and other cities of the Central States, but few live swine were sent to eastern markets. However, the trade in cattle continued to flourish. Large numbers of cattle were driven from Ohio (usually by way of Buffalo and Albany) to New York, where more were slaughtered than in any other city. Illinois, too, raised many cattle, but the distance was too great to permit the driving of fat stock to the eastern coast, and consequently the

[12] Poor's Manual of the Railroads of the U. S. for 1881.

[13] The future success of the trunk lines from the Lakes and Ohio to the Atlantic was due to the extension of these lines by other railroads into the interior of the United States. (Poor's Manual, 1881.)

> Illinois farmers sent their cattle to Ohio, where they were fattened for the New York market. The cattle trade of Ohio thus had a period of great prosperity up to 1850. . . . .
>
> The advent of the railroad put an end to the practice of driving fat cattle to distant markets. Moreover, the railroads brought Illinois farmers nearer to the Atlantic coast than the cornfields on the Scioto had been during the preceding years, and it was no longer impossible for the Illinois farmers to feed their own stock and send it directly to New York and Philadelphia. Ohio was soon surpassed in the production and sale of corn-fed cattle by the corn-raising states farther west. The transportation of cattle was an important source of profit to the western railroads and to the trunk lines, and large numbers of hogs and sheep were shipped from the Central to the Eastern States, constituting almost a totally new element in the commerce between the two sections. In 1859 livestock furnished a larger amount of the through eastward traffic of the Pennsylvania Railroad than any other single commodity, and the other trunk lines and the railways radiating from Chicago, Toledo and Cincinnati transported each year an increasing number of animals destined for the slaughtering-pens of the East.[14]

Cattle Marketing Changes

It was in cities like Cincinnati, Buffalo, Cleveland, St. Louis, and Chicago that the greater number of cattle came to be marketed, but in the early days there was no necessity for the combination of conveniences that today are known as stockyards. As showing the development that took place later on a smaller scale elsewhere we can trace the history in Chicago.[15]

At first the small droves of cattle or hogs which were driven in from the country were readily disposed of to residents of old Chicago. They were bought as soon as seen and seldom was there any reasonable cause why the seller should keep them on his hands for more than an hour after his arrival. As year by year went by, however, the trade increased and there came a demand for some kind of accommodation for

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[14] Johnson, Commerce of the U. S., Vol. I, pp. 239–240.

[15] This account of the growth of the Chicago Union Stock Yards is based largely on an article in the *National Livestock Journal* (Sept., 1870), Vol. I, No. 1, which is quoted from Griffith's *Annual Livestock Review*.

livestock while it remained unsold. This demand resulted in the birth of the present elaborate system of stockyards.

Even at first there was an occasional necessity felt by the seller for some place or other in which to keep livestock for a few hours after arrival in the city, for the reason that sometimes a drove would reach the city too late in the day to meet a sale before the next morning. Or perhaps the arrival of two or three lots at about the same time would induce some competition in the trade, which would necessarily result in more or less delay.

Early Stockyards

Therefore, yard facilities for the convenience of the drovers were indispensable adjuncts of the slaughter houses, even in the earliest days. Proprietors of these establishments rarely failed to mention in their advertisements that, annexed to the slaughter houses were "large, dry, and convenient pens and lots, where droves of cattle and hogs could be kept free of charge until sold or disposed of."[16] One proprietor states that his enclosures are situated in an especially advantageous location "on high, sloping, rocky ground, where stock can be kept neat and clean"; another emphasizes the security of his pens, and mentions that "a stream of spring water passes through them." These yards were in almost every case owned by the proprietor of the adjacent slaughter house, who used them merely as an inducement to the farmers and drovers to bring their stock to his establishment. So far as we know, this may be considered as the ordinary condition outside of Chicago.

At a comparatively early day in Chicago, private yards existed, entirely superseding the smaller yards which belonged to each slaughter house. The first of these yards, located at the junction of Madison Street with Ashland Avenue, and bearing the significant name of "Bull's Head Market," was

[16] *Alton Telegraph*, Oct. 26, 1839.

opened in 1848.[17] These enclosures had no railway connections, however, and the driving of stock to and from them soon became a nuisance. With the growth of the livestock trade of the city upon the completion of the radiating lines of the various railroads, they proved to be too small. Although but at best a make-shift, they were the only yards in the city for some years. In 1856, John B. Sherman leased the Myrick property, a plot of thirty acres on the lake shore north of 31st Street, and laid out yards which were capable of accommodating 5,000 cattle and 30,000 hogs. These yards, situated on the Michigan Central and Illinois Central railroads, and accessible to all the other yards by means of the Illinois Central crossing, became in a short time very popular and soon got the bulk of the trade, so the very name "Bull's Head" passed into oblivion, to be resurrected only when a description of the early livestock trade is being written.

In 1858 the Michigan Southern yards, which had been in existence since the building of that railroad in 1852, began to attain some prominence. These yards, though smaller than Sherman's, were also accessible by means of the Illinois Central crossing, and were said to be well fitted for their purpose. The Fort Wayne yards, the property of the Pittsburgh and Fort Wayne Railway, became the next candidates for public favor. Situated on the west corner of Steward Avenue and Mitchell Street and of about the same size as the Michigan Southern yards, the fact that most of the pens were two-storied rendered their capacity much greater than that of the yards owned by the rival road. They were opened to the public in 1859. The Cottage Grove yards, which had an acreage about half as great as that of the Sherman yards and a capacity of 2,000 cattle and 6,000 hogs, were opened in 1862, but after three years, during which they failed to prosper, they were discontinued.

In the fall of 1864, the Chicago, Burlington, and Quincy,

[17] Andreas, History of Chicago, Vol. I, p. 563. Colbert, Chicago, p. 59.

and the Chicago and Northwestern railways, in conjunction with two or three individual investors, projected the Burlington yards, which were opened the following April, but they were too distant from the city to be accessible for shipping purposes and for that reason they lasted for only three months, when they were torn down and the material sold to the newly formed Union Stock Yards Company.

Civil War Forces Change

During the Civil War, there was an enormous increase in the production of cattle and hogs. The various stockyards of Chicago not only proved too small to accommodate the vast numbers of animals which poured in upon the city from nearly every train, but also, situated as they were at a distance, inaccessible and inconvenient for all parties in various parts of the city, on different and diverging streets, they proved a source of great dissatisfaction to dealers, shippers, and packers. They were in some instances two or three miles apart, and drovers were often obliged to drive their animals through the crowded streets of the city, from yard to yard, thereby undergoing the greatest inconvenience and, in many instances, actual loss, occasioned by the difficulty of driving and the rough pavements. which lacerated and tore the hoofs of the animals, producing pain and disease. The delay and expense of this method of traffic can be better estimated than told in figures.[18] Moreover, trade in cattle and hogs was quite often active in one yard while at another it was extremely dull. The receipts at one yard would sometimes equal the combined receipts of all the others, thus rendering trade brisk at the latter and lifeless at the former. The shippers found that the best way to get the strongest competition or the highest prices was to have their stock where the buying strength was the strongest. Naturally the buyers were more numerous at the terminals of the lines bringing in the largest number of cars of livestock,

[18] Transactions Illinois Agricultural Society (1865–1866), Vol. VI, p. 315*ff*.

and as a necessary result the shippers patronizing the smaller lines were placed at a disadvantage, because they could not get buyers to look at their stock until they had looked over the receipts at the yards of the larger lines. In many cases they could not sell their stock except when there was an insufficient number at the larger stockyards to supply the demand.[19] Commercial reporters found the greatest difficulty in making up a summary of the daily market, and consequently the figures upon which the shippers would naturally rely proved unworthy of confidence. Packers united with drovers and dealers in a demand for better accommodations.

Finally the railroad managers saw the inutility of the old system. The wear and tear on the rolling stock over the narrow and tortuous curves, and the great expense of switching, were eating a large hole in the profits. The magnitude of the business was such that even with most efficient management the railroads could not fairly cope with the situation.

Chicago Union Stock Yards

At its session of 1865, the Illinois legislature incorporated the Union Stock Yard and Transit Company, with a capital of $1,000,000. The nine railroads whose lines converged in the yards took $925,000 of this, the remainder being raised by private subscription. The Union Stock Yards were opened for business on Christmas Day, 1865. The entire area of the tract was 345 acres, of which only 100 were penned off at the time of opening, 45 more being occupied by the hotels and other buildings. The total cost had proved to be more than had been anticipated footing up at $1,654,611. The land purchased was a swampy tract, which at that time lay just outside the city limits and required a great deal of ditching in order to fit it for its proposed use. Twenty-three hundred cattle and hog pens were built, having a capacity at the time of opening

[19] Statement of Mr. Edward Morris, President of Morris and Company, before the Committee on Interstate and Foreign Commerce of the House of Representatives, 1919.

of 21,000 cattle, 75,000 hogs, 22,000 sheep, and 200 horses. The water for the yards was first obtained from the Chicago River, but this proved insufficient and two deep artesian wells were bored to the depth of over 1,000 feet each and these supplied an abundance of water.[20] The officers elected were largely railway officials or packers.[21]

When these yards were first opened each railroad handled the stock in and out of the yards, which brought about long delays to shippers because each railroad looked after only its own business, resulting in detentions to the business of its competitors. The only way to overcome this difficulty and avoid delays was for the stockyards to operate its own terminals where each shipper or each railroad would have equal rights with all other shippers entering the market.

First Livestock Commission Men

The most important factor in a cash livestock market, and as yet unmentioned, had just emerged at about this time, and must now be considered. This was the inauguration of the livestock commission merchant, who supplied a long-felt want and contributed more to the prosperity and progress of the market than any other single cause. In earlier days, as has been noted, the western buyer was compelled to be his own seller. First he was compelled to gather his stock from the prairie farms and thus fill the rôle of drover, and then he had to bring his cattle and hogs to the Chicago market and remain

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[20] Transactions Illinois State Agricultural Society (1867–1868), Vol. VII, p. 404*ff*.

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	Officers, 1866	Officers, 1867–1868
President	T. B. Blackstone	P. R. Chandler, Director, C.&A.R.R.
Secretary	F. H. Winston	F. H. Winston.
Treasurer	Solomon Sturges' Sons	Solomon Sturges' Sons.
Superintendent Construction	Col. R. M. Hough	
Superintendent Yards	F. J. E. Bryant	John B. Sherman
Directors	James F. Joy	James F. Joy, Pres., C.B.&Q.R.R.
"	John F. Tracy	J. M. Walker, Director, C.B.&Q.R.R.
"	Ezekiel B. Phillips	E. B. Phillips, Pres., Mich.So.&No.Ind.R.R.
"	John L. Hancock	H. E. Sargent, Supt., M.C.R.R.
"	C. M. Culbertson	John M. Douglas, Pres., Ill.Cen.R.R.
"	J. N. McCullough	J. N. McCullough, Supt., P.Ft.W.&Chi.Ry.
"	V. H. Turpin	Geo. L. Dunlap, Supt., Chi.&N.W.R.R.
"	R. M. Hough	P. A. Hale, Supt., Chi.R.I.&Pac.R.R.

until he had a buyer. This necessitated the loss of a great deal of time in traveling.[22] The main trouble in the pre-commission firm period grew out of the extended credit system. The drover bought of the farmer on credit, got his transportation on credit, and at the markets the cattle were sold to the wholesale butcher on credit and by him to the retailer on credit and then to the consumer and actually eaten up before they were paid for.

This state of things lasted until 1857 when the first bona fide livestock commission firm began business in the Chicago market. The stock interest was then demanding more and more attention, and when the opening of the eastern railroads so materially increased the demand for the products of western industry, the drover had all he could attend to in scouring the country and collecting the droves of stock. These he could then consign to men of experience in the Chicago yards for sale. The consignees so constituted obtained a market for the stock and received a commission. It was of course to their interest to get the highest prices possible and thus increase their own commissions. They had to be men of known integrity or they could not get and keep business. It was, therefore, to the drover's profit to employ them.

Advantages of Commission Men

The practical advantages of the existence of the commission man are apparent. He was always in the market and knew at all times what stock was worth. Before the establishment of this institution it was almost impossible to get full value for stock when the seller did not know what that value was. Another consideration was that, as soon as it was clear that Chicago was the great stock center of the West, very many men went into the business of shipping to the East and other markets. They bought in the city, and the drovers

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[22] "Transportation and Sale of Cattle," *New York Tribune*, quoted in the *Prairie Farmer* (Dec. 19, 1861), Vol. VIII, p. 407.

who at that time and for many years longer had no newspaper reports to rely on, were forced to sell at such prices as these dealers would give them. Hence arose the necessity of a dealer entrusting the sale to some man in Chicago, and in a short time nearly all stock was sold through commission men.

Even at this point the benefits of the system did not end. The sale of livestock at all the fairs and markets heretofore had been on a credit basis, resulting in loss. Now, the drover of the country could draw on the commission firms of the city for money as soon as his stock was delivered, and therefore he was able to use to his own advantage this capital, and that of the Chicago banks, in the prosecution of his business as a buyer from the western farmers. This system was found to work admirably, and to it may be attributed in an important degree the steady and rapid growth of this market in the sixties and until the present day. For with this institution of the livestock commission firm is completed the number of essential factors which exist in a centralized cash livestock market.

Factors in Centralized Cash Markets

These factors—a stockyards company, livestock commission firms, and meat packing companies—which are fundamental in the development of a great livestock market, were present at Chicago at the time of the Civil War. Their presence made it possible for the successful working of the causes which by the seventies gave Chicago supremacy as the world's greatest livestock market, and enabled the meat packing companies established there to put into operation inventions in refrigeration which introduced a new era in the meat industry of the world.

Causes of Chicago Supremacy in Livestock

The causes of Chicago's supremacy in livestock may be summarized as follows:

1. A comparatively sudden demand at a critical period in the history of the United States, namely, the Civil War, for the concentration of immense supplies of food and Chicago's quick response to such demand.
2. The rapid development of the nation's resources, transportation, and foreign trade, subsequent to the Civil War, Chicago becoming the greatest transportation center of the continent.
3. Chicago's unparalleled advantages as a point where the livestock and other food products of the United States could be concentrated, manufactured, and distributed with the greatest ease, economy, and dispatch.

Chicago World's Livestock Center

As to the first cause, the Civil War massed 2,000,000 men in the field and called for a food supply never before met nor even thought of in this country. The first city in the Union to grasp the situation and to be ready to meet it was Chicago. This city, in the heart of a section that had responded quickly and generously to the government's call for troops, lost no time in beginning the essential work of feeding the troops at the front. The inventive genius of Chicago devised many practical ways for converting cereals, meats, and other products into forms suitable for transportation and preservation. Industries were established that called upon the great agricultural section of the United States for raw products, and laid the foundation in Chicago of other great manufacturing enterprises.

The second fundamental cause is to be attributed to the remarkable development during the Civil War of the natural resources of the United States, the rapid building of railroads, the opening of factories in every direction, and the greatest activity in mining.

The unparalleled quantities of agricultural products called for transportation facilities on a scale unprecedented in any age or country. Railroads were extended from the Mississippi

Valley to the Pacific, and reached into almost every producing section, giving to the farmers an outlet for their surplus livestock, grain, and other products. More than this, the railroads were the most powerful factor in transforming barren plains into built-up villages, towns, and cities, in affording people of various sections the chance to mingle and become acquainted, establish business and family connections, and to receive quickly supplies of all kinds.

The astonishing increase of manufacturing, the rapid development of mining, and the growth of foreign commerce following the war, called for great quantities of food supplies. The chief demand came from Europe and the consequent export trade in meats and livestock originated almost entirely in Chicago.

As to the third cause, Chicago during and following the war was the point where the livestock and other food products of the United States could be concentrated, manufactured, and distributed with the greatest ease, security, and dispatch.

Chicago became the greatest railroad center of the world. Here was a point from which began and ended more lines of railways with more mileage than anywhere else. Chicago was located at the center of the population of the United States and had tributary to it the meat-producing West and the meat-consuming East. Hence, Chicago was the best market for both producers and consumers, the natural trading point where buyers and sellers of livestock met in the greatest numbers.

CHAPTER IV

THE PACKING INDUSTRY IN THE WEST UP TO 1870

Packing on the Farm

The preparation of the beef and pork slaughtered in the winter so that it would be preserved for summer use, by the process of either dry-curing or of pickling, constituted one of the chief duties of the housewife in every well-regulated American farmer's home up to the close of the first quarter of the nineteenth century.[1] The industry thus created by the necessity of procuring the proper food supply for the immediate family of the farmer and for the laborers whom he employed, gradually came to be the source of supply for the general public on the one hand, and on the other an important source of income to the farmer. Hams, bacon, and dried beef could always be exchanged at the country store for sugar and coffee, and the provisions thus acquired were, in turn, sent by the country dealer to supply the city markets. Meats were also pickled by means of a preparation of brine and saltpeter and shipped in barrels to more distant markets.

The industry of packing meats, which thus had its origin entirely within the home, began to be so important during the

[1] From Drake, Pioneer Life in Kentucky (p. 96): "December was our 'killing time.' I shall not take you to the hog pen, nor to the scalding tub, but begin with the cutting up of the fat, a work to which boys are well adapted. The fat being 'tried' out the next labor was chopping sausage meat which I began with a hatchet because too small to lift a heavier tool, and continued until I could use the axe with a vigorous arm. The stripping, twisting into links, hanging on poles and moderate smoke drying succeeded. Lastly, the frying of the feast, for in those days of simple fare, the annual return of the sausage season was hailed by the whole family. To this hour I prefer good and specially clean sausage to any other meat. . . . .

"Other dainties awaited us as the result of killing hogs—doughnuts and crullers, boiled in fresh lard till they assumed a beautiful faun color are still my favorites. Also delicious mince meat—wielded chopping axe in this manufacture many an hour."

second decade of the nineteenth century that the packing on the farm of the surplus supply of pork and beef was insufficient to meet the demand. This was especially true in the New West. In a previous chapter it has been noted that there had been packers of meats in the eastern colonies and states. It is probable, although there is no satisfactory proof, that pork was cured and packed in barrels in Salem, Massachusetts, as early as 1640. This fact is certain that Boston and many other places did quite a trade in that line not long after that date. These establishments, however, were small, and were largely so much a part of the butcher's trade that what may be termed regular packing establishments, as the word is understood today, were probably not built up in the East until after the industry had developed somewhat in the West.

First Western Packers at Cincinnati

It would appear from the records that the first regular packer in the West was Elisha Mills, a downeaster who established himself as a packer in Cincinnati in 1818.[2] However, it is probable that there were some small packers—farmer-packers—as early as 1811.[3] Their plants grew steadily, and by 1830 pork packing was evidently a coming industry. By the winter of 1832–1833, there were several establishments at Cincinnati, and in that season it was claimed that 85,000 hogs were slaughtered there.[4] It was in that period that a definite annual statement of pork packing in the West was begun by Charles Cist of Cincinnati. As one writer summed it up:

> It was Cincinnati which originated and perfected the system which packs fifteen bushels of corn into a pig and packs that pig into a barrel, and sends him over the mountains and over the ocean to feed mankind.

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[2] Armour, P. D., One Hundred Years of American Commerce (Ed., Chauncey M. Depew); see also *Western Farmer* (1841), Vol. II, p. 229. John Mahard, Jr., was a packer in Cincinnati and later in Covington.

[3] *Western General Advertiser*, Feb. 25, 1846.

[4] U. S. Agricultural Report, 1847, p. 325.

Advantages of Cincinnati

In the decade of 1820–1830, Cincinnati rapidly rose to be the "Queen City of the West." Situated on a great bend of the Ohio River which brings it into the interior of the Northwest in the rich farming country between the two Miamis and opposite the Licking River, it became naturally the center of the large fertile region of Ohio and Kentucky.[5] In 1830, it had a population of nearly 25,000 souls, and with the exception of New Orleans was the largest city of the West. The center of steamboat building, Cincinnati was the natural port to which goods from the East were consigned. It was for the same reason the place through which went the exports of Kentucky and Ohio.

A second great advantage that Cincinnati had, lay in its superior transportation facilities. At first the Ohio River afforded the best means, but Cincinnati did not show phenomenal increase in the number of hogs packed until the years 1838–1842 or, in other words, until transportation facilities in the Middle West itself, radiating from Cincinnati, made possible the concentration and marketing in that city of the live stock of the surrounding region. It was this improvement in local transportation followed a little later by the building of the railroads uniting the Central West with the East, which promoted the livestock trade of Ohio, Illinois, and Kentucky. A great increase in the values of cattle, sheep, and hogs resulted from this closer and more rapid communication, between West and East as well as that between West and South, and provided a stimulus to livestock improvement.

The ensuing revolution in the livestock industry in turn encouraged the packing industry in Cincinnati, though in the

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[5] *Atlantic Monthly*, Vol. XX, p. 132. *Cincinnati Western General Advertiser*, Oct. 16, 1844: "Shay, the father of the pork-packing business here, put up pork in 1827, and I well recollect cart loads upon cart loads of spare ribs, such as could not be produced elsewhere at the east . . . . drawn to the water's edge and emptied into the Ohio to get rid of them. The influx of Germans and the rapid increase of inhabitants from 1830 onwards gradually opened a market for these delicacies, as they would be esteemed if they were scarcer and costlier, and obviated such scandalous waste; but even yet a man may get a market basket filled with tender-loins and spare-ribs for a dime."

fifties the great trunk railroad lines with the movement westward of the cattle country, gave Chicago the lead over Cincinnati. Up to the Civil War, however, Cincinnati was the chief center of the pork packing industry in the United States.

In addition to its location in the stock raising region, Cincinnati owed its leading position to its superior banking facilities, for the packing industry demanded that large sums be paid in ready cash. Again, it was often necessary to employ at short notice large gangs of laborers and coopers, thus making the location of a packing plant most advantageous where the demand could be most readily supplied. The necessities of the trade also required an ample supply of salt, and this could be obtained readily at Cincinnati. An added advantage was found in the denser population that afforded a market for the surplus product. In the winter of 1831–1833 there were several establishments at Cincinnati, and in that season it was claimed that 85,000 hogs were slaughtered there.

Description of Cincinnati Packing

In those early days the packing was confined almost exclusively to the curing and packing of hog products and much of the slaughtering was done by the farmers. In 1844 there were 26 packinghouses in Cincinnati; in 1853–1854 the number had increased to 41, and in 1855–1856 to 42.[6]

About 1845 the novelty and size of the industry had increased so that the whole country was interested and many accounts of it were written for public information. In that year a Cincinnati journalist made this statement:

> The putting up of pork has been so important a branch of business in our city for five and twenty years, as to have constituted its largest item of manufacture, and acquired for it the *soubriquet* of *Porkopolis*. . . . . Our pork business is the largest in the world, not even excepting Cork, or Belfast, in Ireland.

[6] *The National Provisioner* (Sept. 13, 1902), Vol. XXVII, No. 11.

The centering about Cincinnati of an industry of such importance was recognized as a great asset. The value of these manufacturing operations to the city consisted in the vast amount of labor required and the fact that the great amount of necessary work furnished employment to thousands at the very season when their regular jobs could not be followed.

The slaughtering, wagoning, pork house labor, the rendering of fats into lard and grease, the production of lard oil, stearin, soap and candle products, bristles and curled hair, the making of lard kegs, pork barrels, bacon and lard boxes, and other employments supplied sufficient work to men, who in the spring and summer were otherwise engaged in the manufacture and hauling of bricks, quarrying and hauling stone, cellar digging and walling, bricklaying, plastering and street paving, etc., which ceased when winter came. It is easy to appreciate the importance of a business which supplied labor to probably 15,000 people who, but for its existence, would have been earning little or nothing for one-third of the year.

In the early stages of pork packing, for example, in 1828, there was so little demand for any portion of the hog, other than hams, shoulders, sides, and lard, that the heads, spare ribs, neckpieces, and backbones were regularly thrown into the Ohio River to get rid of them.

Development in Other Cities

Following the example of Cincinnati and with the development of the agricultural resources of the western states, which cheapened the cost of producing hogs and stimulated production, and encouraged by the demands from southern and eastern markets, the undertaking of pork packing naturally followed at other western towns more or less directly in touch with river navigation, as, for example, at Louisville, Kentucky.

This development in hog packing that was going on in the Ohio Valley far outstripped that industry in the East. In fact, as one writer summed it up:

> The farmers in the Eastern States can form no idea of the extent of pork trade of the West, unless they personally inspect the slaughtering houses that are to be found in Cincinnati, and other large cities. Twenty thousand are very commonly slaughtered and packed for market in a single season by one house; and the whole number slaughtered annually in these establishments west of the Alleghany mountains, averages 2,000,000, weighing each 200 lbs., of net pork, of which at least one-fourth are slaughtered in Ohio. The number packed at Cincinnati alone, equalled 400,000 head in a single season. During the month of December, the latter city is crowded almost to suffocation, with droves of hogs, and draymen employed in delivering the barrelled pork on board of steamers. Some 1,500 laborers are employed in the business from six to eight weeks, and in many cases it is kept in full operation both day and night, including Sundays, from the beginning to the completion of the season.[7]

Effect of Foreign Demand

During the forties the business of Cincinnati increased to such an extent that Porkopolis was known all over the world, and this growth was largely brought about by the foreign demand. For years Cincinnati had catered to the negro trade of the southern planters and also had sent large quantities to New Orleans for shipment abroad. By 1844 the value of hog products shipped to New Orleans was $2,795,676.

In the forties the foreign demand for lard became much greater than ever. The lard made in Cincinnati was exported in packages for the Havana market, where, besides being extensively used for cooking as in the United States, it served as a substitute for butter. It was also shipped to the Atlantic markets for local use, as well as for export to England and France, either in the shape it left, or in lard oil, large quantities of which were manufactured in the East.[8]

An impetus was given also by the fact that about this time the great discovery was made that lamp oil could be extracted

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[7] *The Cultivator* (1851).
[8] *Cist's Advertiser*, April 4, 1848.

from hog lard. One writer ventured to say "that not even the discovery of the art of printing could have given such widespread delight through the western country. Here was death to the whale fishery, spermaceti and all." The lard yielded not only the oil, but it could be divided, and the other half used for sperm candles. The use of lard oil almost entirely superseded that of the whale in all the western region. This annually consumed a considerable number of hogs and transferred the labor and pay for it from the ocean to the prairies.

In these years an unprecedented share of pork was put up expressly for the English market. Fresh American pork had become quite an article of traffic in the Liverpool market, where it was bought readily at prices which paid a good profit to the shippers on this side. According to the *New York Herald* this trade was first started by a Captain Yeaton, when he commanded the packet ship "Oxford." Yeaton, as he was about to sail one winter's day, saw a lot of fine looking dead pigs hanging up in Fulton Market. The idea occurred to him that they might prove a good speculation, and if nothing could be made on them in Liverpool, he could use them as ship's provisions, and thus save himself from loss. The speculation did turn out well and was repeated several times with great success.

By 1848 we find Cincinnati pork packers building up a foreign business in Germany. A Cincinnati firm, Messrs. Bowen and Envart, added in 1848 a new department to the pork business of Cincinnati, cutting and putting up pork for the German markets, on orders from Westphalia, which required the products of 15,000 hogs.

Eastern Meat Packing Growth

It was to meet the growing demand for pork products abroad and in the eastern states, on account of their increasing population, that in Boston, Providence, New Haven, New York, Philadelphia, Baltimore, and Pittsburgh, packinghouses arose on the same plan and model as in Cincinnati, now the

recognized Porkopolis of the United States. For example, in Boston, during the forties, was founded a pork packing establishment which is still an important factor in the eastern section of the industry, though now owned by the G. F. Swift estate. In 1842 John P. Squire and Company was organized by John P. Squire, who in that year began a provision business at Stall No. 25, Faneuil Hall Market, Boston. The actual hog slaughtering establishment dates back to 1855, when Mr. Squire bought a small tract of land in East Cambridge and built a packinghouse there.

Up to the middle of the nineteenth century there are practically no government statistics for the meat packing industry. Since we have reached a time when there were fairly reliable figures gathered, it may be well to include in this chapter a statement summarizing the growth of the industry in figures.

As we have seen during the ten years covered by the eighth census, taken in 1860, the center of the meat industry was at Cincinnati and in the Ohio Valley. The average amount of capital invested per establishment increased from $18,824 to $39,221, or 108.4 per cent, while the average value of products per establishment increased from $64,766 to $113,675, or 75.5 per cent. From that time concentration in definite centers was a marked feature of the growth. The effects of the industrial crisis of 1857, with its wholesale reduction of wages, is seen in the difference in the average yearly wage paid in 1850 and 1860. In 1850 it was $376, which decreased to $202 in 1860, a decrease of 46.3 per cent. The winter packing in eight principal western cities grew from 720,500 hogs in 1850 to 992,310 hogs in 1860.

In the decade from 1860–1870 there was a still greater relative growth. The number of establishments increased by 509, or 196.5 per cent, the largest increase in this item in the half-century. The sum of $14,066,330 was added to the capital invested, 3,308 wage-earners more than formerly found employment, and the benefit to the stock raisers is shown

approximately in the increase of $38,109,591, or 161.7 per cent for materials used. The value of the products increased $46,384,724, or 157.5 per cent. It should be remembered, however, that these values were expressed in a currency which was at a discount in gold and that had to be reduced one-fifth for purposes of comparison with other census years.[9]

Meat Packing in Illinois

Having traced thus far the general development of the packing industry in the West from the time it was established in Cincinnati and seen it spread to other cities, it is well to consider the growth of the industry in Illinois, which became the meat packing state par excellence with the predominance of Chicago.

The first packing establishment in Illinois was located in Madison County, near the mouth of the Wood River, a small stream which enters the Mississippi a few miles below the present location of Alton, where, as early as 1818, there was an "extensive packing house, which packed both beef and pork for foreign markets."[10] Beef and pork were abundant in this region after 1820,[11] but the scarcity of specie and the disastrous failure of some of the local banks made the prices of produce so low that little encouragement or stimulus was given to farming or to the industries which dealt with farm products, until the United States Bank brought relief to the situation about the year 1826.

In 1821, Alton, then a village of only "thirty-two families and one hundred and seventy souls," had, in addition to the inevitable sawmill, a warehouse for packing beef and pork, and

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[9] "Slaughtering and Meat Packing," by Harry C. McCarty, of the Livestock Division, U. S. Census Office, in *The National Provisioner* (July 26, 1902), Vol. XXVII, No. 4.

[10] *Alton Telegraph*, Jan. 28, 1875, in an article by S. P. Gilman, one of the earliest settlers in Madison County. The compiler of the "History of Madison County, Illinois, 1882" (p. 418), quotes this article almost verbatim. Philip D. Armour, in his article on the packing industry, in "One Hundred Years of American Commerce" (Vol. II, p. 283), says: "The paternity of the Western packing business, as we understand it today, belongs, I think, to Cincinnati. In 1818, one Elisha Mills, a 'down-easter,' was established as a packer in Cincinnati."

[11] Brown, Michael, in *Alton Weekly Telegraph*, Oct. 22, 1875.

its natural associated establishments, a slaughter house, a tannery and a cooper's shop.[12] Its location at a vantage point on the Mississippi River made it a natural market for livestock and provisions, and in 1832, with a population which had increased between 500 and 1,000, "numbers of hogs and cattle were here slaughtered for the New Orleans market."[13]

Packing at Alton and Other Towns

At the beginning of 1837, Alton had four large packing-houses, and the value of the pork packed and prepared there for market ran up into the hundreds of thousands of dollars. It was the intention of the proprietors to make Alton the central depot for these great staples. Alton, however, had no monopoly over the business of pork packing, as regards the other towns of Illinois, though St. Louis, its great commercial rival in other respects, apparently packed little pork or beef, preferring rather to act as a point of reshipment than as a point where the packing was actually done. Beardstown, a hamlet on the Illinois River six miles below its union with the Sangamon River, was Alton's earliest competitor, and had by 1833 a fairly well-established business.[14] The first packer in Quincy barreled 3,000 hogs during 1836, in his initial season,[15] and the combined exports of flour and pork from that town for the year 1837 were valued at $100,000.[16] 1837 witnessed the beginning of the industry in Peoria,[17] and it is probable that Meredosia and the other Illinois River towns where the business is later found, had likewise embarked on the enterprise by this time.

[12] History of Madison County, Illinois, quoting from Peck, Guide for Emigrants (1831).

[13] Baird, Robert, View of the Valley of the Mississippi, p. 212.

[14] Perrin's "History of Cass County, Illinois" (p. 31) tells of the shipments of pork for 1833. In 1829, the year in which Beardstown was founded, an advertisement in the first issue of the *Galena Advertiser* (July 29, 1829), offered to supply the mining district with pork, beef, flour, etc., from Beardstown, which was stated to be the market for the produce of Morgan, Sangamon, and Schuyler counties, at the same freight rates as charged from St. Louis. This may have referred merely to country-cured produce, but it is at least suggestive that the industry may have had a very early start at this point.

[15] History of Adams County, Illinois, p. 265.

[16] Mitchell, Illinois in 1837, p. 138.

[17] History of Peoria County, Illinois, p. 543.

Early Chicago Meat Packing

To complete the study of the beginnings of the packing industry in Illinois, the history of packing at Chicago alone remains. Although meat packing began at Chicago almost as early as it did at Alton, it is clear that the industry at the former place had little in common with that in the southern part of the state. The pork and beef packed at Chicago was sent to Buffalo, Rochester, or Detroit by way of the Great Lakes; that from the Illinois and Mississippi river towns went to New Orleans, where it was sold to the cotton planters, or reshipped to the eastern states, to the West Indies, or to European markets. Although the products from Chicago might ultimately compete in the distant New York market with those from the other Illinois towns, the competition there was of such a negligible quantity, if it occurred at all, that the packers and commission merchants of Alton and St. Louis did not think it important enough to mention. But the present immense proportions of the meat packing business in Chicago make a detailed statement of its early history as regards the names of packers, the location of the plants, and the various minor details concerning the conduct of the business, both interesting and important.

The first slaughter house at the settlement of Chicago was said to have been built in 1827 by Archibald Clybourne, government butcher for the Pottawatomies, for the purpose of supplying the garrison and settlers with meat.[18] The first packing was not undertaken, apparently, until 1832. In October of that year George W. Dole purchased from 150 to 200 head of cattle from a gentleman at Hickory Creek in the

[18] In Andreas' "History of Chicago" (Vol. I, p. 561), an account is given by Sylvester Marsh of his early experiences in Chicago. When he came to Chicago in 1833–1834, provisions were all taken from Ohio to support the little community of 300 persons. This looked like a business opportunity to Mr. Marsh, so he engaged in the slaughterers' and drovers' trades, bringing the cattle from the Wabash Valley. He claims that there was no slaughtering house in Chicago at that time, so for the first 60 days of his operations he led the cattle to an old elm tree that stood on Monroe Street, about where the Court House now stands, and there, by means of a tackle, he swung the animals up and killed them. His claim that he was the first to engage in the meat business, even in the supplying of the local market, is not substantiated by other writers.

Wabash Valley.[19] The beeves were driven from this region 150 miles to their purchaser in Chicago; they were slaughtered by John and Mark Noble on the prairie near the lake, at what is now the corner of Michigan Avenue and Madison Street, near where the "palace" of the Episcopal bishop long stood. The packing was done at Dole's warehouse at the corner of Dearborn and South Water Streets. The barrels in which the beef was packed were brought from Detroit, and the beef when packed was shipped to Oliver Newberry of that place. The price paid for the lot was $2.75 per hundredweight and the product amounted to 287 barrels of pork and 14 barrels of lard.[20] In December, 1832, Dole slaughtered 338 hogs which were also driven from the Wabash, the slaughtering being done in the backyard of his warehouse and the packing in the store. There were no barrels on hand when the pork was slaughtered, so the meat was packed in bulk and stored away until the barrels could be made during the winter. The price paid for this lot of hogs was $3 per hundredweight. This was the first lot of hogs ever packed in the city of Chicago.

First Chicago Pickled Pork and Beef

The large emigration to Chicago during the summer of 1833 created a demand for pickled pork and beef, and to supply this demand Dole and Clybourne purchased more hogs and cattle from the Wabash. Both these men packed their meat at the Clybourne slaughter house on the east side of the North Branch, the former packing 250 head of cattle and 1,000 hogs, and the latter 250 to 600 cattle and from 2,000 to 3,000 hogs.[21] The cattle cost $2.50 and the hogs $3 per hundredweight.

In 1834 Gurdon S. Hubbard moved from Danville to Chicago and engaged in the packing business in the "Old Bank

[19] The former figure is given in the "Seventh Annual Review of the Trade and Commerce of Chicago," published by the *Tribune* in 1858 (p. 17). The larger figure is given in the second volume of the same publication, entitled "The Railroads, History and Commerce of Chicago, 1853."

[20] These figures are given in Colbert's "Chicago" (p. 45). (Colbert's statements tally well with the others.)

[21] Variant figures are given in the "Seventh Annual Review of Trade and Commerce" (p. 17), and in Andreas' "History of Chicago" (Vol. I, p. 561).

Building" at the corner of Lake and La Salle Streets. He purchased 5,000 hogs from Vermillion County, St. Clair County, and Wabash County, and slaughtered them on the South Branch. Being disappointed in getting barrels, he had to put the pork into bulk sides until spring, when he purchased barrels from Cleveland at $1 apiece and had the pork packed.[22] During this season, at the new slaughter house of Oliver Newberry and G. W. Dole, on the South Branch, from 300 to 500 cattle and 1,400 hogs were packed, while Clybourne is said to have eclipsed his record of the previous year by packing 600 cattle and 3,000 hogs.[23] The whole number packed in Chicago during this season, therefore, must have approximated 1,000 cattle and 10,000 hogs.

During the season, 1836–1837, Sylvester Marsh packed 6,000 hogs to supply the contractors on the canal which had just been begun. Up to 1841, Marsh, Dole, and Hubbard were practically the only men engaged in the packing business, Clybourne confining his activities chiefly to butchering for the local market. During the season, 1839–1840, Hubbard packed 4,000 cattle and 10,000 hogs, and during the following season increased his output to 7,000 cattle and 12,000 hogs. No statement of the total amounts packed by these three packers for these years is available. Hubbard's packinghouse was located from 1837 to 1840 on the north side of Kinzie Street, near the Rush Street Bridge. In the latter year he built a warehouse on South Water Street, between Clark and La Salle Streets, which he occupied until 1848, when he moved to the North Branch, East Water Street, between Michigan and Illinois Streets, where his slaughtering had always been done. He purchased his cattle in 1840 from the Illinois River country, McLean County, Fulton County, etc. Marsh's packinghouse

[22] The question of dates in connection with the life of Mr. Hubbard seems hard to establish. When, however, we read in his "Life Sketch" by Henry B. Hamilton (p. 157, note), that it was in 1829 that the "barrel" incident occurred, we may be quite sure that the writer is in error. It seems probable that Mr. Hubbard engaged in the drovers' and slaughterers' business at least as early as 1831. (See Chicago Historical Society Publications, Vol. IV.)

[23] Blanchard, Discovery and Conquest of the Northwest, with a History of Chicago, p. 421.

was located on Kinzie Street near the Rush Street Bridge until 1853, in which year he retired from the business.

The first decade of the industry at Chicago shows no remarkable features. The center of the state industry of pork packing was at Alton. Only in the packing of beef did Chicago do any business which compared favorably with the down-state town. This first decade of the history of the packing industry in Illinois was also marked by the complete ascendency of Alton as the chief packing point in the state. The second decade witnessed the growing importance of the packing establishments in the newer towns farther north, while the early part of the succeeding twenty years were distinguished by the phenomenal rise in the importance of Chicago as a beef and pork packing point and by the ultimate concentration of the industry of the state in the great metropolis on Lake Michigan.

Early Packing at St. Louis

The decade, 1840–1850, marks the rise of St. Louis as an important packing point. Hitherto, that city, so advantageously situated at the place on the Mississippi where all the Missouri, Illinois, and upper Mississippi River traffic could be reshipped to larger boats for the completion of the southward journey, had been content to derive its profits from its commissions. Ship merchants were growing rich from Illinois farmers, and were constantly urging the latter to build up their own town of Alton as the competitor of St. Louis. By 1845, however, the "back country" of Missouri began to furnish hogs and cattle in increasing numbers and the packing business rapidly grew to such an extent that the city soon became a good market, not only for Missouri, but also for large numbers of Illinois hogs, which, if the older conditions had remained, would have gone to Alton. The decade, 1840–1850, at Chicago was not marked by any great increase in the volume of business done in the packing of beef and pork, although the number of firms engaged in this business gradually increased,

and the foundations were laid for the rapid development of the industry following the building of the various railroads at the beginning of the second half of the century.

Development in Chicago

During the season of 1842–1843, Archibald Clybourne again did some packing. On this occasion about 3,000 head of cattle were put up for William Felt and Company, extensive farmers and commission merchants of Rochester, New York. This is alleged to have been the first beef packed in Chicago for an eastern market. A directory of the city states that in 1844 four large packinghouses were doing a large business.[24] Of beef, 14,856 barrels were put up, the major portion of which was used in the city; while the amount of hogs killed and packed exceeded that of any previous season. This directory shows that, although Chicago owed her pre-eminence primarily to the fact that she was a very important grain exporting center, beef and pork products bore a relatively important relation to the other products exported.[25]

During the season 1844–1845, Julius W. Wadsworth, of the dry goods and grocery firm of E. S. and J. Wadsworth, became the partner of Dyer and Chapin in their packing operations. This firm in 1845 packed the first tierce of beef ever put up in Chicago for the English market. The next season Chapin dropped out of the firm, and for the next five years the firm continued as Wadsworth, Dyer and Company. This firm was the most important in the city for several years. In 1845, it was doing two-fifths of the business of packing beef, putting up about 100 beeves each day, and as late as the

[24] The relative amounts of packing and other commodities produced in Chicago at this time are given as follows:

	1842	1843		1844	1845
Beef	762 bbls.	10,380 bbls.	Wheat	586,907 bu.	128,967 bu.
Pork	15,447 "	11,112 "	Corn	35,358 "	2,443 "
Hides	6,947 "	14,536 "	Oats	53,486 "	3,767 "
Lard	367,200 lbs.	2,823 "	Flour	2,920 bbls.	10786 bbls.
Tallow	151,300 "	1,133 "	Furs	446 pk.	393 pk.
Wool	1,500 "	22,050 lbs.			

[25] Curtis, Western Portraiture and Emigrant's Guide.

World's Fair in 1893 the beef packed by Wadsworth, Dyer and Company received much attention and credit.

Railroads Change Packing Centers

With the opening of the Chicago and Michigan Canal and the operation of the spurs of railroad which radiated from Chicago, after 1850, several changes took place.[26] In the first place, prices all along the Illinois River had come up to the prices paid at Chicago and this speedily caused a large decrease in business at the smaller points, whose chief basis of existence was found in the fact that they were able to secure hogs at a lower rate than was current at the larger packing points from those farmers who did not prefer to drive their herds any distance. A correspondingly large increase, on the other hand, is to be noted at Chicago, Peoria, and Quincy. Beardstown held its lead by a narrow margin until the season of 1851–1852, when both Chicago and Peoria packed more hogs than did the former place. As long as the rivers were the main channels for carrying merchandise and produce, Beardstown could compete successfully with any packing point in Illinois, being even important enough to attract attention at Cincinnati. But the coming of the railroad era banished forever the supremacy of Beardstown and the river points in pork packing circles.

The packing establishments in the large cities had so many advantages over those in the little river towns that it was a foregone conclusion that, with the removing of the problem of transportation, the livestock would be sent to the more advantageous market in the city, while the business of packing in the smaller places would languish. This was the universal effect on the packing industry of the coming of the railroads.

The general effects of the advent of the railroads on the packing business are even more apparent when one recalls that it was only after the first lines were built from Chicago, that the city began to assume any importance as a packing

[26] *Prairie Farmer* (Sept., 1851), Vol. II, p. 382.

point for pork products. During the season of 1852–1853, over 48,000 hogs were packed by Chicago establishments, which was more than twice the number packed in the city during the previous season. More than 320,000 hogs were packed in the state of Illinois during the season of 1852–1853, and about one-seventh of this total was packed at Chicago. Three seasons later, in 1855–1856, of the 375,000 hogs packed in the state, Chicago packed more than one-fifth of the total. Peoria and Quincy were still close behind Chicago in 1855–1856, with 55,000 and 43,000 respectively as the total for the season. Alton, Beardstown, Canton, and Springfield packed between 20,000 and 30,000 hogs each, and not another town in the state packed 10,000.

Summer Pork Packing Begun

About 1857 the packing of hogs in the summer was begun in Chicago on a small scale. The monetary crisis of 1857 cut short packing operations in the spring, and from May to the close of the summer two Chicago firms packed more than 37,000 hogs. The action of these "ice packers," together with those of the eastern livestock buyers, rendered the market quite active during the summer of 1858. Ice packing soon began to manifest superiorities over winter curing; the animals cost less and fresh cured hams and fresh lard found preference in the market over the very best winter curing. Thus the pork trade began at this time to undergo a certain revolution. The business of packing which had come to be confined to a few very favored points, and restricted to a few weeks of winter weather, and which demanded the largest and fattest of animals, could now spread over the whole year. It could be done wherever cheap ice could be secured and offal disposed of to advantage, and the bulk of the animals required would be younger and carrying less flesh than those formerly used.

The statistics show that other places besides Chicago experimented to a certain extent with summer packing

through the years that followed. Quincy, for instance, during the summer of 1871, packed 10,000 hogs, and during the following season half that number. During the summer of 1872, there were 95,000 hogs packed at Chicago, not a very large amount when considered in the light of the whole number packed during the whole year, yet the absolute number was large enough to show that summer packing was bound to become important.

From this time forward the history of the packing industry in Illinois is little more than that of the packing industry in Chicago. The 8 packers engaged in the business in 1851 had increased to 58 in 1864. There was a steady increase in the number of hogs packed in Chicago until, during the season of 1861–1862, the half-million mark was passed for the first time. This season was the first during which the packing business done at Chicago exceeded that done at Cincinnati. Never again did the Ohio metropolis regain her place as the chief packing point of the country. By 1862 Illinois held first place in meat packing, a position she has never since yielded.

CHAPTER V

EARLY MEAT PACKING—TECHNIQUE

Early Packing a Winter Industry

The packing industry of the early days was, above all things, a seasonal industry. Before the adaptation of refrigeration to this business, packing operations could be carried on only during cold weather. The first frost heralded its beginning and the last thaw hastened its close. The largest volume of business was carried on during the "dead of winter," when steady, but not intense, cold prevailed.

The season for the slaughtering and packing of cattle always began before that of hogs. The first frost caused a withering of the grass of the prairies which constituted almost the only food for the cattle. The same frost completed the ripening of the corn on which the hogs were to be fattened for from three to six weeks before being taken to market. Therefore, after the first frost the season for the packing of cattle opened. This usually ranged from the middle of October to the first week in November.[1] At Chicago in 1848 the first beef was packed on September 26, which was commented upon as being unusually early.

Packers were always anxious to begin operations as early as possible. At many of the packing points navigation was closed during the greater part of the packing season, so that all the beef or pork which they could get to the eastern market before the winter's ice caused a cessation of shipments, would

[1] For aid in gathering material on early meat packing in Illinois, its technique and financing, the author is indebted to Mr. Clytus A. Freeman, who embodied part of the results of his research in an unpublished thesis at the University of Illinois.

command, as a rule, better prices and have a readier sale than the larger consignments which would be shipped later on.

Length of Packing Season

The season for the packing of hogs usually began somewhere between November 1 and November 15, though at Chicago, Galena, and such northern towns operations in pork sometimes got under way even earlier than this. The length of the season was determined by the state of the weather, the supply of animals, the condition of the money market, etc. Sometimes the season was practically over by the middle of January; sometimes operations had not yet ceased in March.

The packing season of the early days was almost never a time of continuous work, day after day. A great many elements combined to break up the continuity of operations. One of the most common causes of the suspension of slaughtering and packing was unfavorable weather. A thaw or a rain almost invariably caused the packers to fear that the meat would become spoiled, and on the other hand, when it was very cold, the workmen were unable to continue their occupation in the frail buildings which were necessary for the business. Sometimes a supply of animals did not come along in sufficient amounts to keep the establishments running to their full capacity. Severe or stormy weather, even if not cold enough to stop packing operations, would cause the drovers to hesitate to bring the animals across the prairies. The roads might also be quite as impassable on account of mud as because of large drifts. Financial difficulties not often caused very light purchases or none at all, the oft-recurring panics and periods of "tightness in the money market" being second only to the weather as a cause of the interruption of packing operations.

Labor Supply Sources

The seasonal character of the early packing industry furnished an opportunity for employment to many men who

followed entirely different occupations during the rest of the year. A large amount of labor was required at precisely the season when many of the regular vocations of the workmen could not be pursued. Thus, employment was given to a large number of "city" coopers, who were set to making lard kegs and pork barrels and hogsheads at a period when stock barrels and other forms of cooperage were not in demand, and also to "country" coopers, whose main occupation was farming, during a season when their farms required no labor. Another large body of men whose main work was agricultural, was engaged in getting out staves and heading and in cutting hoop poles and other like tasks for the same business. The slaughtering, pork house labor, rendering of fats into grease and lard, manufacturing of stearin, soap, bristle dressing, and so on, supplied abundant work to men who in the spring and summer were engaged in the manufacture of bricks, in quarrying, cellar digging, bricklaying, plastering, and street paving. In addition to this, the hauling of meat from the slaughter houses to the packinghouses employed many teamsters who under ordinary conditions would have found it difficult to get work at that season of the year.

Packers ran great risks due to changes of weather and consequently, in order to save their goods, often needed a very large force of laborers for an emergency, in addition to the force regularly employed, or in cases where they had suffered a disappointment in their previous arrangements. Only a large city could meet such unforeseen demands, and this consideration undoubtedly aided Cincinnati and Chicago in gaining superiority over other packing points.

The usual working day was 8 hours at Cincinnati and 10 hours at Chicago,[2] but not infrequently laborers were called

[2] Thus the *Peoria Register* states that one workman of that city cut up for packing in a workmanlike manner 300 hogs averaging 246 lbs. in 11 hours and 48 minutes; and the next day 253 hogs, also averaging 246 lbs. This was pronounced a great day's work for one man. (*Alton Telegraph*, Feb. 5, 1847.) Cist, Cincinnati Miscellany (Vol. II, p. 318), says: "Two hands in one pork house cut up in less than 13 hours 850 hogs averaging 300 lbs."

upon to work for a much longer period, as an emergency demanded.

The Early Packinghouse

The subject of the early packing plant is the logical successor of the description of the meat packing season. This was originally very simple in structure. It was, in fact, nothing more than a warehouse used during the major portion of the year by commission and wholesale merchandise dealers, and was only devoted to packing purposes during the winter, when it could be employed in no other way. Almost the only paraphernalia necessary were the large vats in which the pickle was kept. With the increasing importance of the business, however, houses used only for packing purposes, or for slaughtering and packing, were erected at the more important points. In addition to the packinghouse, there was often a lard house and a smokehouse as an integral part of the plant.

There were at least three rooms in an ordinary packing plant, though in a small building the operations, which would usually be performed in separate rooms, might be carried on in the same one. One room was used as a storeroom for the carcasses, newly arrived from the slaughtering establishments, and was also a cutting and weighing room. Another was the storeroom where the barrels filled with the pickled meat remained awaiting shipment. The third was the room in which the large tanks containing the pickle were situated. The tanks were huge iron affairs in which the meat was placed for twenty-four hours before being packed. Originally tubs were sufficient for this purpose, and in the early days when packing was done in some commission man's warehouse, the large vats were probably not a part of the equipment. The cellar was often used for storage purposes.

Most, if not all, of the work in the earliest packinghouses was done by hand, but mechanical devices to lessen labor became more common year by year. In 1836 a steam engine,

just introduced into one of the packinghouses for the purpose of grinding sausage meat, was considered a great curiosity.[3] The pickle in which the meat was placed had to be changed several times during the process of curing. At first the pickle was carried in pails from tub to tub. An improvement on this was the pumping of the liquid by hand. The final introduction of rudimentary steam pumps for this purpose was heralded as a seven-day wonder. A further improvement which lessened the amount of time and labor necessary was brought about by the weighing of the meat in the pickle. Many such examples could be cited.

Early Meat Packing Methods

The methods of meat packing became matters of greater intricacy and of greater care as the volume of the industry increased and the extent of the market of the products enlarged. In the earliest days the meat was merely cured and packed and no further attention to "method" was deemed necessary, but when an attempt was made to introduce American meat into England, the packers found that they had to deal with a purchasing public more fastidious in its tastes than that of their native land.

The first method of the packing of beef for the English market appears in newspapers soon after 1840. This beef product soon grew in favor and found comparatively ready sale, and with the modification of the tariff law in 1843, American pork, beef, lard, and bacon were imported into England on a rather extensive scale. The Britons would have none but the best, and English importers of American meat products often found it necessary to issue warnings to the western packers that "more care and cleanliness must be given, before any permanent improvement in the demand can take place."

Minute directions were given to the American packers to

[3] *Alton Telegraph*, Feb. 3, 1836.

aid them in satisfying the English market.[4] Only fat cattle were to be used for export purposes, the entire carcass, except the head, feet, and legs, being cut into pieces of 8 pounds each. Dry salt was first well rubbed into the meat, and it was placed in huge tubs or vats filled with pickle and with enough saltpeter to give a bright color and proper consistency. In 24 hours, as soon as the blood was sufficiently purged out, the beef was to be removed to fresh pickle, and after a time to a third set of tubs, where it remained until packed for exportation. The pickle had to be strong enough to float an egg. Saltpeter was to be a part of the first compound only.

Beef Packing for British Markets

The meat for the English market was packed in tierces containing 38 pieces, a total weight of 304 pounds of meat, in addition to which the weight of the salt and the pickle made the huge casks very much heavier. Since it was very important that when the beef was opened it should present a sightly appearance, great care had to be exercised to trim the edges of the pieces and to lay them in smoothly. Between each layer of meat a layer of salt was placed, and over the whole two or three inches of coarse salt. For the pickle, fine, crushed salt—Kenawha, New York, or Liverpool—sufficed, but for the salt which was packed around the cured meat, only coarse sea salt could be used, Turk's Island or St. Ubes being most usually employed. Marine salt was used exclusively, after it was discovered that native salt destroyed the brightness of the meat, making it dingy and yellow, and wholly unsalable in England or on the Continent. Two iron hoops were placed around the tierce after it had been packed and headed, in addition to the ordinary wooden hoops, and through a hole bored in the head of the tierce 4 or 5 gallons of pickle were poured in over the meat. Then the hole was plugged and the meat was ready for shipment to its distant destination.

[4] *Ibid.*, Dec. 9, 1843. Hunt's *Merchant's Magazine* (Jan., 1844), Vol. X, p. 87.

Pork Packing for Export

The same process of curing was used for pork as for beef, but while fat beef was demanded for the foreign market, only light pork would be received. Europe wanted no fat pork, at any price. The pieces had to weigh 4 pounds each, and were packed in barrels of 50 pieces, or 200 pounds. All parts of the carcass could be used except the head, feet, legs, and knee-joints. The first pork sent from Cincinnati and other western packing points to England was of such poor quality that it did not give satisfaction, and in this case, as with beef, it was only when packers, cutters, and hewers had been brought over from Cork and Liverpool that the products were packed in a manner satisfactory to the fastidious Briton.

Unless great care was exercised in the curing of the pork there was danger that it might not keep. One of the risks of early-season packing was that the heat might spoil the meat before the salt had penetrated it sufficiently. Again, if the meat were put in the brine before it had become thoroughly cooled, it caused a fermentation in the pickle, which in turn produced a disease in the meat called "measles," that rendered it unwholesome.

The cleaver divided the hog into three parts—hams, shoulders, and middles. The pieces thus cut underwent further trimming to get them in the proper shape for the market. The size of the hams and shoulders varied with their appropriate markets and with the price of lard. When lard was high the pork packer was tempted to trim very close, if, indeed, he did not render the whole shoulder into lard. The different classes of cured pork were made from different sizes and conditions of hogs, the finest and fattest making "clear" and "mess" pork, while the residue was put into "prime" and bacon. The inspection laws required that "clear" pork be made of the sides with the ribs out, and it took the very largest hogs to receive this brand of meat. "Mess" pork had the entire sides with two rumps to each barrel. For "prime"

pork, hogs of a much lighter weight would suffice; two shoulders, two jowls, and sides enough to fill the barrel made up the contents.[5]

Different Kinds of Pork Packed

Most of the "clear" pork packed in the West was sold in New England, where nothing but the best would be accepted. Not a little of it went to the cod and mackerel fisheries. "Mess" pork was largely used by the commercial marine and by the various governments for their navies. Pork destined for the navy, whether it was for that of France, England, or the United States, was put up under the specifications made out for the purpose, hogs of a certain weight being often designated for the purpose. Prime pork was packed for ship use, and for the southern markets whence it was sold to the plantations in the cotton states and in the West Indies. With the acquisition of California a great deal of the pork found a market there.

"Bulk" pork was intended either for immediate use or for smoking. The former class was shipped on flat-boats down the Mississippi during the winter, but it formed no large part of the whole. By far the greatest portion of the bulk pork went immediately to the smokehouses where it was kept, as far as possible, until ready for shipment. It was then packed in hogsheads containing 800 or 900 pounds, the hams, sides, and shoulders each being kept by themselves. Bacon was sold in large quantities to the iron manufacturing districts of Pennsylvania, Kentucky, and Ohio, to the fisheries of Pennsylvania, Maryland, and Virginia, to those engaged in the coasting traffic, and to the inhabitants of the Mississippi above New Orleans.

With the enlargement of the market for western products, many new cuts of pork were introduced. Some were called by their English names, e.g., Cumberland, Stratford, etc.

[5] Cist, Cincinnati in 1851, p. 281.

Some were merely combinations of the cuts of the earlier days, e.g., "prime mess," "long and short middlings," etc. The same general grading of the meat was used, however, wherever pickled pork was sold.

Pork and Beef Inspection

Very strict laws of pork and beef inspection were enacted, and certain points were specified where the official inspectors overhauled each barrel of pork, made sure that it was in good condition, and that it corresponded with the requirements for the particular grade for which it was to pass. Inspected meat brought higher prices than that which was not inspected. The main advantage of official inspection was to increase the confidence of purchasers abroad in the soundness of the provisions found in American markets, and to set a standard by which certain grades could be designated. The courts ruled that an inspector was responsible in giving his warrant regarding the condition of the meat, not only for certifying that the meat was in good condition when he examined it, but also that it was in a sound enough condition to be fit for sale within a reasonable length of time thereafter.[6] Inspectors who did not show due diligence in the discharge of their duties were liable to suit for damages.

The sole business of the packer of pork and beef of the early days was that of "packing." The present integration of the industry has caused us to think of the slaughtering and dressing the carcass, and of the various processes by which the waste products were utilized, as inseparable parts of the business of packing. This idea is, however, the result of experience with the conditions of the present day, but an examination of the business of meat packing when it first began to attain importance discloses conditions which were entirely different.

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[6] Hunt's *Merchant's Magazine* (Aug., 1848), Vol. XV, p. 185. Decided by the Supreme Court of Louisiana, June 22, 1847, in the case of *Pardos v. Bozant.*

Slaughtering and Packing Kept Distinct

The business of butchering was begun before that of meat packing, and, therefore, it is to be expected that when the latter began to engage the attention of capitalists, the packers merely made use of the means already in existence. Since the first packers were mostly commission merchants, who packed "on the farmer's account," this tendency toward keeping the business of packing distinct from that of slaughtering was intensified. At Cincinnati, indeed, the slaughter houses were owned by individuals, but were under the supervision of one man who was appointed by the packers in order that the work should be done uniformly.[7]

Slaughter houses were very frail buildings, the usual method of construction being to board up the sides with movable lattice work, which was put up to admit the air at ordinary temperature, but was shut down during the periods of intense cold which occasionally attended the packing season, and which would freeze the pork so that it could not be cut up to advantage. Slaughter houses, almost from the first, for obvious reasons were located on the outskirts of the village, and were usually situated on a stream.[8] But at Chicago there seems to have been little objection to the slaughtering of cattle or hogs in the village. Before a slaughter house had been built there, Sylvester Marsh, one of the early provision dealers of the city, made use of an old elm tree which stood on a corner of Monroe Street, near where the present court house stands, from which, by means of a tackle, he swung the cattle and hogs he had killed.[9] The first cattle slaughtered for Dole, Chicago's earliest packer, were also killed and dressed in the open, on the prairie along the lake shore at Madison Street. And the first hogs which were packed in the city were slaughtered in the back-

[7] The actual condition in 1837 was that Coleman owned 10 of the 21 slaughter houses and supervised the operation of 8 others. See Lloyd, Western Address Directory, 1837, p. 280.

[8] At Cincinnati they were located on Deer Creek east of the city half a mile from the Ohio. During the winter this stream acquired the expressive name of "Bloody Run."

[9] Andreas, History of Chicago, Vol. I, p. 541.

yard of Dole's warehouse at Dearborn and South Water Streets. As late as 1849 there were slaughter houses in the same block as the Sherman House and the Post Office.

Chicago Slaughter House Regulation

It was in the year 1849, due to the strenuous objections of several citizens of the rapidly growing city, that the Council was at last induced to pass an ordinance "to prevent the erection of slaughter houses within the city of Chicago." This ordinance not only forbade the erection, fitting up, or conversion of any buildings in the future for the purpose of "slaughtering, killing or dressing" cattle, calves, sheep, or swine, but also forbade the continued occupation of the existing buildings for that purpose, and imposed a fine of not less than $10, nor more than $100, for any violations.

This ordinance caused these slaughtering establishments which had not already done so, to move to a location on the South Branch of the Chicago River, but even in this new location the slaughter houses were soon in trouble with the city, and it was found necessary to flush the sluggish river by pumping water from the canal, in order to cleanse it "from the filth deposited by the slaughter house men, which had so corrupted the water as to make it stink unbearably at every turn of the paddle wheels of the numerous steam boats upon it."

Hog Slaughtering Operations

Operations at the slaughter houses of the early days included more than the mere killing of animals. Sometimes these additional operations were described in advertisements as "slaughtering and dressing." Sometimes the "dressing" was not mentioned specifically, but it was always implied, however. As soon as the farmer or drover sold his hogs to the packer, the animals were driven from the pen adjacent to the packinghouses, where they had been kept awaiting their

sale, into a small pen which was a part of the slaughter house that the packer had chosen for killing and dressing this particular batch of hogs. The animals were packed in this pen until no more could by any means be crowded in, and then one of the workmen entered and walked over the backs of the droves, knocking them on the head, one after another, with a two-pointed hammer adapted to that purpose. The carcasses were then dragged out by hooks to the sticking room where their throats were cut, and the carcasses hung up for all the blood to drain off. After the blood had ceased to flow, the carcasses were passed on to huge caldrons of boiling water, often having a capacity of 1,000 gallons, whence after a moment's immersion, they were removed and tossed upon a large table to be cleansed.

Even at a very early day it was found economical to give each workman a special duty, and as many persons worked on one hog as could get around it. One cleaned out the ears, which had to be done while the hog was reeking with steam. Others pulled off the bristles and hairs, while others scraped the animal more carefully. To show the speed attained, at Cincinnati in 1851, the workmen were able to clean three hogs per minute. As soon as this work was done, the animal's hind legs were stretched apart by means of a stick called a "gambrel," and three men carried the carcass away to another portion of the building, two of them carrying the front part on their crossed hands, and a third grasping the gambrel. These men hung the hog upon a hook, and the "gutter" next stripped out the entrails. This latter process was sometimes accomplished after the carcass had been hung up in the cooling room, which was usually located in the center of the building. After being thoroughly cooled for 24 hours or more, the carcass was placed on a block and the head severed with a large cleaver, and at some slaughter houses the whole carcass was cut up into pieces of the proper size for packing. The carcasses, or the tubs of properly trimmed pieces of meat, were

then hauled to the packinghouses, where the meat was pickled and packed for shipment to the southern and eastern markets.

Methods at Cincinnati

The most complete information regarding methods of slaughtering and packing in the early days is of necessity gathered from writers who told of the business as it was carried on at Cincinnati. The gigantic concerns of this city overshadowed those at any other place. Since practically all the men engaged in the slaughtering and packing operations of the regions farther west served their apprenticeship at the great "Porkopolis," and mentioned their years of experience in that city as an especial recommendation, it is fairly certain that their methods were as closely copied as possible from those practiced at Cincinnati. It is very probable, moreover, that new inventions and improvements were not introduced in the establishments in Illinois and the other western states until after they had been in successful operation at Cincinnati.

Early Division of Labor

We have been accustomed to think that the division of labor which has been so emphasized as peculiar to the packing industry of today is a comparatively recent feature. Actual study of the conditions in the early packing industry leads to quite a different conclusion. One writer of the thirties, indeed, was reminded of the pin factories of Birmingham, made famous for their division of labor by Adam Smith's illustration,[10] and this was the fact first noticed by almost every writer who describes the industry as it was carried on at Cincinnati. In 1837, this process had been expanded so far at Cincinnati that it was "the task of twenty men to knock down, bleed, scald, remove the hair, bristles, and entrails, and have in readiness for the cleavers six hundred and twenty hogs in eight hours, which constituted a day's work in this industry."

[10] Martineau, Harriet, Retrospect of Western Travel, Vol. II, p. 45.

Packing was usually done in warehouses situated on the wharves in the days prior to the railroad era, while the slaughter houses were located on the outskirts of the city. This fact introduced another industry into the field, that of hauling the pork from the slaughter houses to the packinghouses. At Cincinnati, in 1835 the average load was from 25 to 40 carcasses,[11] and in 1851 the improved streets and better wagons made it possible to carry from 60 to 100 at a load, and even then 50 of the largest class of wagons were employed continuously throughout the season.[12] This work of drayage was an important allied industry until the building of the railroads made it more profitable to have the packinghouses in the suburbs of the city where the slaughter houses were situated.

Slaughtering and Packing Combined

It is not a very difficult matter to trace the gradual combining of the business of slaughtering with that of packing. The separation of these two industries was not a natural one and in Chicago, at least, does not appear to have continued for very long. After the first year or so, when it became clear that packing could be carried on with profit, the warehouses were enlarged, and slaughtering operations were conducted in them as a matter of course. At Alton, and doubtless at many other of the early packing points, the two businesses were kept separate, largely due to the fact that those engaged in the slaughtering business received custom from the local meat market and from the farmers as well as from the packers. As early as 1838, however, there are references in newspapers to the slaughtering of hogs and cattle at one of the packing establishments at Alton.[13] The combining of the two industries from that time on was rapid, and by 1850 there is little mention of slaughtering being conducted as a business separate from packing. It was customary for the packers to form

[11] Hoffman, C. F., Western Address Directory, 1837, p. 280.
[12] Cist, Cincinnati in 1851, p. 278.
[13] *Alton Courier*, April 6, 1855.

partnerships lasting through the packing season with a man who owned a slaughter house, and this naturally led to more lasting unions.

The elimination of the necessity for hauling the dressed beef long distances through the city was not the only benefit which resulted from the combining of the slaughtering and packing operations in one building. Economies of labor, and savings in the use of floor room and in other lines were also effected. The killing of the animals came to be done on the top floor of the packing buildings, an inclined plane being used to drive the animals up to the killing rooms. Sometimes in fact the hog pens were located on the roof.[14] The carcasses were then carried on an endless trolley, while the various processes of cleaning were being carried on. The force of gravity lessened the hand labor necessary, and the meat was cut into proper pieces for packing with little additional work. All these operations seem to have attracted as much attention and interest in Chicago fifty or sixty years ago as they do at the giant plants of Swift, Armour, Morris, Wilson, and others today. And the earlier writers exhausted their vocabularies in describing the operations as carried on at the Cincinnati and Chicago establishments.

Early Cattle Slaughtering

Information about the early methods of slaughtering cattle is less complete than that concerning the slaughtering of hogs. Almost no cattle were killed and packed at Cincinnati, and the number packed at any other western towns besides Alton and Chicago were negligible. Probably if more explicit information were available it might be found that the progress of division of labor and of economizing in carrying, storing, etc., began nearly as early as did similar operations in the hog slaughtering business.

The following description of the killing of the beeves in

[14] Cincinnati in 1851 (p. 228), description of Miller and Oldershaw's establishment.

1848 at Wadsworth, Dyer and Company's establishment in Chicago, shows the condition of the business at that time:[15]

> We stood by while one animal was dispatched, which happened to be a fractious steer, with no notion of being killed any faster than he could help it. He utterly refused to hold his head still for the axe, being apparently possessed of the idea that the iron might be too hard for his skull. Consequently the axeman, though apparently skilled in his business, failed to strike correctly and it was several minutes before the poor beast could be got down, filling the room in the meantime with his roars of terror and pain.
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> It appears to us that the axe is an unfit instrument. The top of the head is such that unless the blow is fair, it only wounds and enrages the beast. Besides the handle is so short that the operator is obliged to stand so near the beast as to frighten him to evade the blow. Would not a heavy hammer, made like a sledge fitted to a long elastic handle, be a much better instrument? It would seem that it would be easier to direct it, at the same time that the operator would stand at such a distance as not to alarm the animal.

This suggestion seems to have been adopted, a hammer with a small head and long handle being used during the next year.[16]

After being killed and allowed to bleed, the animals were passed on to another room where the skinning and eviscerating was done. The carcass was then halved and hung up in the cooling room until it was in condition to be packed. In 1849 Wadsworth, Dyer and Company killed and dressed 220 cattle at their establishment in one day, which at that time was declared to be the largest day's work ever done in that line at any slaughtering house in the country. The entire number of men engaged in slaughtering, dressing, and packing the beef at this house was 75 to 100.

When it is realized that at the great plants of the larger packers at Chicago today, the capacity is 2,500 cattle and 15,000 hogs, and that 800 men each have some separate por-

[15] *Prairie Farmer* (Nov., 1848), Vol. VIII, p. 337.
[16] *Prairie Farmer* (Dec., 1850), Vol. X, p. 382.

tion of the work to do in the slaughtering and dressing of the cattle, and 182 have some part of the work to do during the 12 minutes which it takes for a hog to pass from the cutting to the cooling rooms, the operations of these early slaughterers and packers may seem somewhat paltry. Yet it was the experimenting in those early days that made possible the enormous expansion which followed the introduction of refrigeration.

Progress by Experiment

Almost every year where any specific data regarding the industry can be found, it is possible to note some progress. In 1850, for example, Wadsworth, Dyer and Company, found it necessary to install a steam engine to do large amounts of the pulling and lifting in their establishment, which was quite an innovation. This aided very greatly in the killing of the cattle and handling of their carcasses, the following account being given of the method:

> A man with a huge rope noosed at one end enters a pen where stand half-a-dozen live cattle and he tosses the noose over the horns of a bullock. The other end of the rope is already passed through a ring in the floor and is attached to a wheel which is turned by the steam engine. As the rope tightens the bullock is bound to come out, and when his head is drawn sufficiently near the ring, a huge Boston axe of tomahawk shape is applied to his skull and he falls—killed by steam. His head and hide are jerked off. He is eviscerated, a gambrel thrust under his nether tendons, another rope over another wheel is wound by the same steam engine, and he is hoisted upon the beams and slid off to dry and cool. From the time he gets the ugly rope around his horns until in halves he hangs a mere beef, four minutes may elapse . . . . so summary and relentless is the fate of cattle here.

Further illustration would but serve to emphasize the gradual improvement in the process of slaughtering, and would add little more than a mere list of the minute advances which season after season produced.

By-Product Material Thrown Away

Profitable utilization of the waste products is carried to such an extent today that the packers pay more for the live cattle and hogs than they receive for the dressed meat, the profit from the by-products often being more than enough to make up the difference. It is possible to trace the growth in the importance of these by-products throughout the whole period of the early packing industry.

As long as the slaughtering was done at an establishment which was conducted independently of the packing plants, the offal, head, internal organs, blood, hair, and other trimmings of the slaughtered animals were considered a part of the waste material which the slaughterer must dispose of. The packer did not want to be bothered with it, and for that matter, neither did the slaughterer. In fact, at Cincinnati all this material was dumped into the Ohio River, and since the current was swift enough to carry it away that proved to be an easy method of getting rid of it.[17]

At Chicago similar methods were tried, but the sluggish waters of the South Branch were not able to carry away their load, and the stench became so great that the city council forbade the packers the use of that river as the depository of this refuse. The material then had to be carried off to a distance sufficiently far from the city and there buried, this operation entailing considerable expense, the blood being the only refuse which could be discharged into the river. It was considered a great advance when the Chicago papers were able to state in 1850 that the offal from all the slaughter houses was being carted away to be used as a food for hogs, so that the only real waste was the blood. Thus, at this late day, the Chicago packers considered themselves fortunate if they did not have to pay someone in order to have the refuse from the slaughter houses destroyed.

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[17] Mackay, Charles, Life and Liberty in America, p. 128.

Early Saving of By-Products

At Cincinnati, on the other hand, and at the packing points in the southern part of Illinois, which had learned the business from the Cincinnati concerns, the utilization of by-products began at a much earlier day. The only payment made to Coleman, who operated the majority of the slaughter houses at Cincinnati, as early as 1837, was that he was allowed to have the fat and grease of the entrails and the bristles, this being valued at that time at about 50 cents per hog. Apparently the rest of the refuse was considered valueless.[18] The Alton slaughter houses during the season, 1844–1845, were willing to pay 10 cents per head for the privilege of slaughtering, accompanied by the right to keep all the portions of the animal's anatomy which were not destined to go into the barrel.[19] The Alton newspapers had a great deal of fun at the expense of the St. Louis slaughter houses, which were offering at this same time as a special inducement that slaughtering would be done free of charge.

At a period shortly before this in Chicago hogs were butchered anywhere in the city, the fat taken from the entrails, and the whole given to the owner, for 18 cents each.[20] During the forties the usual custom at Cincinnati was for the slaughterer to take the refuse as his payment for the slaughtering and dressing. In addition, he bore the cost of delivering the hogs to the packinghouses, but since every year enhanced the value of his perquisites, such as the fat surrounding the intestines, the heart, liver, etc., for food, and the hoofs, hair, etc., for manufacturing purposes, for the two years preceding 1850, from 10 to 25 cents per hog were paid as a bonus for the privilege of killing.[21] When the slaughter houses had been finally absorbed by the packing establishments, the by-products continued to be used with increasing profit.

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[18] Lloyd, *op. cit.*
[19] *Alton Telegraph*, Oct. 18, 1845.
[20] *Prairie Farmer* (Nov., 1841), Vol. I, p. 81.
[21] Cist, Cincinnati in 1851, p. 278.

Lard a Chief By-Product

One of the most important of the by-products of the packing industry, namely, lard, was derived to a very slight degree from materials that would otherwise have been thrown away. In the early days it was simply a matter of preference on the part of the packer whether he packed all his pork, or whether he "tried out" a portion of it for lard. The ultimate decision rested upon the prices of the various products. In a year when the prices for lard ranged rather high, the packer preferred to devote more of the product to that commodity. If prices were not good for lard, he had his choice between curing his pork in bulk and pickling it in barrels.

The process of rendering lard was not infrequently undertaken by the packer, but this was by no means always the case. Even when the scraps of meat and the portions of the carcass of the hog not available for packing were melted at the packinghouse in order to separate the lard from the meat, the product was often sent to a special establishment to be refined, since the crude lard could not be sold readily. But the machinery necessary for the satisfactory refining of lard was too expensive for many packers who did their business on a small scale.

It gradually became more and more apparent that almost every portion of the hog's carcass could be utilized in the manufacture of lard. Only the best fatty portions were devoted to the manufacture of the high grades of lard for cooking purposes. For the poorer grades there were other uses. The manufacture of neatsfoot oil was one of the earliest uses to which inferior lard was put, and the manufacture of tallow candles was transferred at an early date from the farmer's fireside to the factory. Indeed, at Pittsburgh, which preceded Cincinnati as the chief packing point in the country, as early as 1817, there were four tallow chandlers employing seven men and having an annual product valued at $32,600.[22] In that same year the town of Lexington, Kentucky, boasted four

[22] Fearson, H. B., Sketches of America, pp. 203, 245.

candle and soap factories whose products were valued at $12,150. One of the earliest industries undertaken at Alton was the manufacture of neatsfoot oil.

At Chicago, for the twenty years or more prior to 1857, one establishment which was conducted by Charles Cleaver took all or nearly all the tallow and lard from the various packinghouses and manufactured it into various marketable products.[23]

Lard Oil and Stearin

Lard oil was discovered to be a valuable substitute for whale oil, and in 1842, or possibly shortly before that date, factories for the rendering of this product were erected at most of the cities where packing of any considerable amounts was carried on. In this year at Alton one purchaser of hogs devoted them entirely to the manufacture of this commodity, while a Chicago packer was packing no prime pork, but "trying out" all the pork of that grade for lard in preparation for the lard oil mill which was soon to be built.[24] Cincinnati, in 1849, boasted 30 lard oil manufacturers, among them the largest in the United States. During that year 11,000,000 pounds of lard were run into oil.[25] Lard oil was made by divesting the lard of one of its constituent parts, namely, stearin.

The claim was made for it that it was sure to displace whale oil for illuminating purposes, and that for lubricating purposes and for the use of manufacturers of woolen goods, lard oil was superior to any other known.[26] In addition to these uses it entered quite largely into the adulteration of olive oil and sperm oil, 60 or 70 per cent of these products being composed of the adulterant. The separation of the stearin was effected by means of alcohol, the amount obtained being 70 parts of oil to 30 of stearin. The cheapness of coal oil and

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[23] Cleaver, History of Chicago, p. 109.
[24] *Chicago Democrat*, Dec. 14, 1842.
[25] Hunt's *Merchant's Magazine* (Nov., 1849), Vol. XXI, p. 577.
[26] *Prairie Farmer* (Jan., 1843), Vol. III, p. 2.

the beauty of its light made it so popular that in spite of the frightful accidents which occurred during the first years of its use, it had by 1870 almost completely supplanted lard oil and stearin for purposes of illumination.

Early Lard Rendering

The earliest method of rendering fats into lard consisted in the use of very large kettles, in which the scrappage and other fat was thrown. By 1845, or thereabouts, the employment of superheated steam and the utilization of large, closed, boiler-iron tanks, were adopted. By putting on a pressure of 80 to 100 pounds to the square inch, a whole tank of fats could be melted in a few hours, whereas the old process might take days. Several explosions occurred, due to some defect in the lard tanks during the years when they were of a largely experimental nature.[27] Gradually the business of rendering fats into lard was taken over by the packers. This change took place in Chicago between 1854 and 1857. In the latter year the last independent lard refiner, George Cleaver, went out of business.

The application of steam to the extraction of valuable products from the wastage of the pork and beef packing operations was extended still farther as soon as its feasibility was proved in the rendering of fats. In 1851, one firm at Cincinnati engaged in the business of putting up lard, and devoted the entire remaining carcass to the steam extracting tanks. The pressure, 70 pounds per square inch, was so great that the whole mass was reduced to the consistency of powder. The fat was then drawn off and the residue, a mere earthy substance, was taken away for fertilizer. This firm, and others of like nature, also utilized the great mass of heads, ribs, backbones, feet, and other trimmings from the various packing-houses. Even the offal was put in the extracting tanks and forced to yield up its quota of grease.

[27] *Alton Courier*, Jan. 13, 1854; Dec. 17, 1857; etc.

Soap and Glue Making

The inferior material gained in this way as well as the grease secured from the hogs which had died en route, or from pork which had spoiled through want of care, entered into soap manufacture, which soon came to be a very lucrative business. Much of the offal, as well as the hoofs, horns, and bones, were used in the manufacture of glue. This industry had attained importance in Cincinnati by 1850, though it does not seem to have been significant in Chicago until a later period. The proprietors of the first glue factory in Chicago, so it is said, did not purchase their materials from the packers, but went out on the prairie and dug up the materials the packers had buried there during the day. The packers did not acquire the control of the manufacture of glue until after the close of this early period, Armour and Company being the first to enter this field, by the purchase of Wahl Brothers' Glue Factory in 1885.[28] Not all of the large packers of the present day own their own glue factories, and so in this case the process of integration is not complete.

The waste materials of various sorts were very early used for fertilizing purposes, the residuum from the glue factories, from the extraction of lard and grease, as well as the blood and offal being turned to this use. The utilization of this material for commercial fertilizers, however, does not appear to have been adopted before the eighties, when the scarcity of Peruvian guano made the demand for fertilizer sufficient to cause a more scientific preparation of these materials for market.

Bristle Dressing and Chemicals

The business of bristle dressing was carried on by three different establishments at Cincinnati in 1847, giving employment during a part of the year to more than one hundred hands. The industry had grown very rapidly in importance since 1840, in which year twelve laborers were employed, the value of the

[28] Armour, J. Ogden, The Packers, the Private Car Lines, and the People, p. 196.

product being only $16,000. The season's supply in 1847 was valued at $35,000, and in 1851 at $55,000. Bristles were also an article of export at Alton, St. Louis, and other western towns. The hair, as well as the bristles from hogs, was made a product of commercial importance also at a very early date. No data have been discovered which enable one to state just when this industry passed into the hands of the packers. The preparation of the bristles so that they can be used in the manufacture of brushes, etc., and of hair, so that mattress makers will purchase it, is now confined entirely to the packing plant.

By 1851, the packers of Cincinnati and other western towns were getting some profit from the extraction of prussiate of potash from the hair, hoofs, and offal. There is no definite statement as to whether this industry was separate from that of slaughtering and packing, or not, but the general method of conducting these businesses in early days leads to the belief that the extraction of chemicals from the wastage of the packing-houses began as an independent industry and became one of the processes carried on in the packinghouses only at a very much later date. The blood was also used at this time, or before, for the manufacture of prussian blue. These chemicals were used in New England print factories for coloring.[29]

The gall from the beeves was saved at Chicago as early as 1848, and sold at 37½ cents per gallon, while the horns and hoofs of steers brought 10 cents a set.[30] At a somewhat later period the manufacture of glycerin and gelatin was designated as among the allied industries of beef packing.[31]

Cattle Hides Important

From the earliest days of the industry the hides of cattle were considered a very valuable by-product, and never seem to have been among the perquisites of the slaughterer. Tanneries were not connected with the packing establishments, and the

[29] Cist, Cincinnati in 1851, p. 285.
[30] *Prairie Farmer* (Nov., 1848), Vol. VIII, p. 336.
[31] Transactions of the Illinois State Agricultural Society (1867–1869), Vol. VII, p. 162.

business of tanning hides is one of the few industries, dependent in a large measure upon the packing business, which has not become to a great degree an integral part of it.

Cooperage was, of course, indispensable to the early packers. On two different occasions in the first years of the business in Chicago, the non-arrival of the barrels which had been ordered necessitated the piling of the carcasses of the hogs on the banks of the river for several months until the opening of the navigation in the spring made it possible for the shiploads of barrels to reach the city. There is no record during the early history of the packing industry to show that the barrels were made in a plant which was owned by a packer, though at the present time the manufacture of barrels is but one department of the packing business.

Curing Hams by Non-Packers

The business of curing hams was often carried on by the packers, but this was by no means necessarily the case. A great many firms existed at the various towns and cities in the West which were engaged entirely in the business of curing hams. These firms either purchased directly from the packers or lard refiners that portion of the hog's carcass which they used in their business, or they obtained the whole carcass from the slaughterers or owners, and then sold that portion of the carcass which they could not use to the firms engaged in some other line of the pork business.

As time went on less and less was heard of independent firms devoted entirely to this business, and by the fifties, although many small firms remained in the ham-curing business, no large packing concern was considered complete unless it cured its own peculiar brand of hams. Hams were either smoked or sugar-cured. The former process was usually carried on in a smokehouse situated some distance from the remaining buildings of the plant, or in the packinghouse cellar, the location being determined by fire considerations.

CHAPTER VI

EARLY FINANCING OF THE PACKING INDUSTRY

Difficulties of Financing

The financing of the early packing industry presented peculiar difficulties, due to the fact that from one-half to four-fifths of the value of the finished product represented the value of the raw material.[1] The large sums of money necessary for the purchase of the cattle and hogs which the farmers had for sale, had to be paid out to the farmers in cash at the beginning of the packing season, from two to eight months before the packer could expect the products of his packinghouse to be sold in the distant southern and eastern markets.[2] The outlay for livestock was so considerable and such large sums were required at a day's notice that, wherever the business was conducted on anything like an extensive scale, the necessary supply for available credit or cash on hand had to be large. No other business in the West needed such large funds for the time it occupied. The power to command almost any amount of money desired is what gave Cincinnati her continued superiority over the Illinois, Kentucky, and Indiana towns, where natural conditions for meat packing appeared far more favorable than those of the Ohio metropolis.

The capital required to construct a packing plant was not large. Under the primitive conditions of the early days little machinery was used. Slaughtering was done out of doors or

[1] Cincinnati Miscellanies (Feb., 1846, Vol. II, p. 318) gives the proportion as 80 per cent. Charles Cist's "Cincinnati in 1851" (p. 286) gives 60 per cent as the correct proportion. The truth is that the fixed charges caused the variation in the price of raw material to be greater than that of the packed product.

[2] The case of the farmer who packed on his own account constitutes an exception to this statement. It will be discussed later.

at slaughtering houses, which were distinct from the packing-houses, and all the packer needed was a large covered room without any special facilities whatever. The construction and maintenance of a packinghouse was, however, the least of the packer's financial troubles.

First Packers Commission Merchants

The original packers in the West were merely commission merchants, dealers in almost every kind of commodity, who simply engaged in the business of packing meat products as a side line which would take up their attention and keep their warehouses in use during the winter seasons. They packed the pork and beef which the farmers brought them in barrels, being paid a small sum for their labor and gaining an additional revenue by selling the farmers the salt, the saltpeter, and the barrels, at a slight profit to themselves. They then superintended the shipping of the product to New Orleans or to New York "on account of the owners," and secured an additional commission for attending to this for their farmer and drover clientele.

This form of conducting the packing business was not suited to any very large operations, and was speedily discarded for one more in harmony with the importance which the industry rapidly assumed. It is important only from the fact that in the period covered it was this old form of conducting their business upon which the packers almost invariably had to rely as a last resort. Some farmers, drovers, and investors could always be found who were willing to risk their money in investments in pork, and the humble commissions which the packer received from these individuals tided him over the "hard times" and gave him a little capital to begin operations the next season.

When the packer's only business consisted in packing on commission for the owner, it is obvious that he would need no very great amount of capital. The building in which the business was conducted had already been constructed for another purpose, and the revenue which he received from it during the

summer would hardly justify the charging up of the cost of the building to the capital account of his packing business. But even if the packer had no structure which he used at other seasons of the year for other purposes, he was not obliged to expend any very large amount of money to provide a suitable building. Any sort would do, and if he could obtain no building at all, he might succeed very well in his packing operations without one. Indeed, at Peoria, Illinois, on one occasion, a new packing warehouse just after its completion was flooded by unusually high water for the fall of the year, followed by freezing weather which made it useless for packing purposes. Undaunted by this slight difficulty, the packer moved his appliances out onto the ice, where he did his whole season's packing. He was so successful, moreover, that out of the profits of that single season's operations he was able to pay entirely for the house which he had not been able to occupy. This does not represent the usual situation, however. Even at a very early day, the packers, whose chief business was doubtless conducted on a commission basis, advertised that they were also prepared to pay cash for the farmer's hogs and cattle. Few of these men had capital enough so that they could pay cash to the farmer for his stock and wait six months or more for their returns.

Western Packers and Eastern Capital

Almost from the very first, western packers came to depend on eastern capital for the funds necessary for their business. Whenever the western house was merely the branch of some large eastern concern, the question was not one which caused the packer any worry. In this case he would be little more than a manager of a small portion of the total business of the concern. Many packers were, however, independent. In order to accommodate such, and at the same time obtain good investment for their own capital, eastern bankers, produce dealers, and commission merchants were accustomed to scatter

their representatives throughout the West wherever packing operations of sufficient magnitude were being carried on, for the purpose of making advances on the pork which was being packed for shipment to the western markets. These men, whose representatives usually came West annually and remained only during the packing season, provided the packer with funds to pay the farmer cash for his stock. Thus, for example, at Alton in 1843, it is recorded that "the city was filled with persons who commanded foreign capital that was seeking investment in the single product of the country, at such prices as would insure a profitable return."

At times the aid of the banks was directly enlisted by the packers. Sometimes state banks aided in financing them, but this alliance of the state banks with the packers was exceptional, rather than general. Banks were, of course, always ready to discount bills for the packers, but these bills had to be drawn for such a short time that the packers could not take full advantage of them. Moreover, at the time when the packers most needed funds, the banks were compelled to make the hardest terms with them.[3]

Banks, Packers, and Speculation

The lesson of several unfortunate speculations in which banks were involved had a salutary effect upon the early meat packing industry. Some of the errors into which pork dealers had fallen during the periods of wild enthusiasm in the thirties and forties may be learned from a comment[4] on the flour business in 1840, as contrasted with that of pork packing or of dealing in grain and provisions.[5]

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[3] *Alton Telegraph*, Nov. 16, 1839.

[4] *Ibid.*, Aug. 24, 1839.

[5] A distinction ought to be made in some cases between the packer who merely did the physical work of putting the cured flesh of hogs and beeves into barrels, and the "packer" as the individual who had purchased the hogs, paid for their slaughtering, curing, and packing, and who often risked his money by shipping the product to a distant market where he might expect to obtain a higher price. The "packer" in the second and broader sense, might and sometimes did, include the packer in the former and narrow sense, but the term also included many commission merchants and provision dealers, some drovers, large farmers, and stock raisers, and, in fact, any individual who invested his money in the business.

> In this industry there is not, as in the case of corn and pork, any danger of overdoing. For the last five years great attention has been paid to corn and pork, as, indeed, there ought always to be, and we hope these articles will continue to bear a good price; but it is evident that the large overstock of pork in the Atlantic cities, laid in at high prices, and now selling at a great loss to the packer, will cause the price of pork hereafter to come down to the standard of other things. The fall of provisions, we doubt not, will produce one good result. It will cool the courage of those who have heretofore been so fierce in racing through the prairies, and have contributed to establish the foolish habit of contracting and receiving hogs in the gross and at the pens of the farmers.

The speculative element in early packing which led country banks in Middle West states to attempt to make large profits in it resulted sometimes, as, for example, at Alton, in an effort by these banks to "monopolize the pork, beef, lead, and grocery trade of the Mississippi." As a part of one scheme, the firm of Newberry and Dole of Chicago had been furnished funds to the extent of $80,000 for a business carried on under their own name, although in reality they were merely packing on commission for the president and directors of the bank, and their friends, who were thus using the funds of the bank to contribute to their personal wealth. Similar investments made in several other cities totaled at least $2,070,000. Such methods, as is well known, resulted in disastrous banking failures with consequent distress in the business.

During the years which followed the close of this chapter in the history of the financing of the packing industry, or from 1840 on, whenever speculation seemed imminent and there appeared to be the danger that the buyers of pork were paying more than eastern and southern markets would warrant, the old days were recalled, and the pork dealers were advised to make their calculations very carefully, since "they must recollect that there were no banks to break this year, to help them out of a bad scrape."[6]

[6] *Alton Telegraph*, Dec. 3, 1842.

Aid of Banks to Cattle Feeders

Banks bore an important indirect relation to the packing industry as a whole, in their assistance to the "cattle feeders." Although this relates more directly to conditions in Ohio, as a type of the general relation of agricultural credit to the packing industry, it is worthy of mention. The banks of Chillicothe, Circleville, Columbus, and Xenia did more of this business than any others and found that it was the most profitable banking business of any in the state of Ohio. The cattle trader, ready to buy a drove of cattle to fatten, would apply to the bank for a loan. For this he gave a bill of exchange on New York or Philadelphia at four months, which the bank discounted, receiving the funds when the cattle were sold, thus getting both interest and exchange, which brought a profit of 10 or 12 per cent.

Nor was this the end of the transaction. The cattle dealer paid out the notes he had received from the bank, to the "grazer," who in turn gave them in payment for cattle purchased farther west. This was of additional value to the bank, since it kept its circulation well diffused. This same method might have been adopted by the packers, had not the long delays which often occurred in New York before a sale could be profitably effected, made it unwise as a general policy for them to give bills due in four months' time.

Packers were sometimes fortunate enough to sell the pork or beef they had barreled, before it left their own warehouses. In such cases they were certain to come out safely in the operation, and the buyer ran all the risk incurred in holding it for the eastern market. More often, however, the representatives of the eastern firms were authorized to do no more than make advances to the packer up to a certain amount on all pork consigned to the firm making the advances. Such sums, further, never amounted to the full value of the product, and in time of financial stringency when the packers were in the greatest need of generous help on the products, there was often

the greatest disparity between the amount actually paid and the value of the commodity. At such times it was customary for the packer to resort to the old expedient of packing the goods on a commission basis. A common advertisement was that "liberal advances would be made by the packers to their country customers and to others wishing to pack or ship to New Orleans or the East."[7]

Packers were by no means always residents of the town where they were engaged in the business of packing. Large produce dealers often had packinghouses located at several points. There their personal representatives might engage in the actual business of packing, or they might hire a local packer to put up the produce for them on commission. The different towns in the stock raising districts were only too glad to see any such investors coming their way.[8] These dealers had abundant resources and the local packer was often very glad to escape the risk of loss after shipping his products to the eastern markets, preferring to pack on commission for large produce firms rather than to pack on his own account.

Burden of the Local Packers

From what has been stated already, it is clear that, after all, much of the burden of the financing of the packing industry fell upon the local packers. Packing was sometimes done by the representatives of the large produce firms of the cities, who had all the capital they needed for the purchase of the cattle and hogs brought to market by the farmers, but most commonly, the local packer had to work out his financial salvation by himself. If he was fairly sure of a speedy sale of his products he was able to get the necessary funds to provide his raw materials by discounting his bills at the banks. More often he was obliged to consign his product to some New Orleans, New York, or Boston produce and commission

[7] *Alton Telegraph*, Nov. 18, 1843. Advertisement in this instance of W. Libby and Company.
[8] *Alton Telegraph*, Sept. 9, 1843.

dealer, who, in turn, advanced him a portion of the future price of the commodity in that market.

This aided the packer to secure the necessary funds, but left him with all the risks which might result from fluctuations in prices. The eastern firms seldom advanced such a large portion of the total value of the product that a fall in prices, however great it might be, would result in any loss to them. On the other hand, the very fact that eastern dealers would not advance the whole of the capital necessary for the financing of the packing business, compelled the packers to operate with the needed sum on a wide margin. Thus, in good years, the packers were able to make vast profits, in comparison with the actual amount of capital which they had invested in their business; while a single bad season might easily wipe out of existence their entire original capital, together with all the profits of their previously successful years.

Almost every panic or financial stringency resulted in a cessation of the purchase of livestock from the farmers for cash and the devotion of the entire plant to "packing on account of the owners," whenever they were willing to risk the danger of loss due to the variations in the market. This resort to packing on commission during periods of depression, which is characteristic of the early phases of the industry, was due to two causes: Eastern capitalists had no specie which they wished to tie up in produce at these times, and western packers usually lost all they had, periodically with the recurrence of each successive panic.

A Complicated and Uncertain Industry

After this review of the actual financing of the packing industry, however, there still remains for consideration the special qualities of the industry which certain problems made such a complicated one. Few fields for investment manifested greater uncertainty and variability than that of the early packing industry. These undesirable characteristics were due to

conditions which have now passed away. Prior to the railway era, prices might vary a great deal at two nearby points. If prices did not suit the farmer or drover at one place, they merely drove the animals on to some other place, or, it may be, did not sell them at all, but held them over for the next year in the expectation of higher prices. The variation in prices at the different places, with the consequent diversion of the supply of livestock from its customary market to some other, made the amounts packed at the different points vary exceedingly from year to year. Thus, in 1839 Alton expected to pack 60,000 hogs, but such large numbers were diverted to the points along the Illinois River that only one-third the amount planned for was packed at the former place. Again, while 40,000 hogs from Kentucky crossed the river for market at Cincinnati in 1834–1835, the following season showed that only 5,000 hogs had been secured from that state.[9]

A further cause of uncertainty in the packing business was found in the difficulty which the packers experienced in trying to estimate in advance the number of cattle and hogs which would be marketed in a given season. The most common cause of losses to the packer was due to his anticipation that the supply would be smaller than it proved to be, and the consequent higher prices at the opening of the season than the actual supply would have warranted, had the packer been able to ascertain beforehand what the number marketed would be. No system of information regarding the condition and amount of the crop was provided until after 1844, when the enterprising editor of the *Cincinnati Price Current* prepared each year a table of statistics of the pork packing business of the preceding season; but even those valuable figures provided no forecast of the number of hogs which would be marketed during a given season, and so were of little direct assistance to the packers.

Although pork and beef packing was a business which

[9] *Alton Telegraph*, Feb. 3, 1836.

embraced one of the most important staples of the West, and furnished one of the chief articles of export, it was stated that probably there was no kind of employment that was so indefinitely understood by those who were engaged in it, and none that had proved so ruinous. Apparently about every other year the packers lost money on their operations. Indeed, one observer stated in 1851 that "for the past ten years he had never known two consecutive seasons to pay operators well."

Early Packing Speculative

Citations of actual conditions during certain representative seasons show clearly the guess-work and speculation which entered so largely into the early financing of the pork and beef packing of the West. The speculation, moreover, was not confined to men whose business had for years given them the experience which would enable them to foresee what the demand for any specific article would probably be, and what prices could be reasonably paid on the basis of prospective demand. Instead, these speculators were largely men of small capital and of small experience in the devious ways of the eastern financiers, and it is not at all strange, therefore, that they were made to bear all the heaviest risks, although they were least capable of doing so.

At Chicago the business was almost from the first in the hands of men of larger experience and with better eastern connections, and in that city there were few complaints of the losses which were so common a feature of the business as it was conducted in the southern part of the state. As the railroads became extensive in the Middle West during the fifties and sixties of the nineteenth century, the prices of all markets were made practically the same, and knowledge concerning the supplies of livestock in every community, and, indeed, all over the country became common property. With the arrival of this condition of affairs the financing of the packing industry ceased to be a blind gambling proposition, and became a science.

This period also marks the entry into the business of the first firms whose names have later become the symbols of Chicago pork and beef packing. These firms soon acquired a large capital of their own, and no longer depended on the advances which the eastern produce dealers were willing to dole out to them. On the contrary, they soon reversed the old order of things so completely that they gave the eastern provision firms advances in the way of meat products for which these firms paid only after they had sold the goods.

CHAPTER VII

BUILDERS OF THE MODERN PACKING INDUSTRY

Pioneer Packers' Constructive Work

The modern meat packing industry has grown out of the crude kind of packing business described in the preceding chapters because of two forces, one mechanical, the other human. Both did much to reduce the element of speculation in the early primitive stage and to improve its technique. Gradually in the Middle West the financing of the industry was put upon a solid basis, as has been shown at the close of the last chapter. By the time of the Civil War, railroads were knitting the country together, stabilizing livestock and meat markets and preparing a ground-work on which the other force in the development of the industry might build the complicated business of today.

This other force, the human element, was composed of several men who are numbered among the great constructive business minds that the United States has produced. They were men who were given an opportunity and were able to acquire a large experience and to benefit by it. Many of them had connections in consuming centers which enabled them to develop national organizations in both the production and the distribution of meats and meat products. In the years immediately preceding and following the Civil War there arose several of the meat packing companies whose names are considered the most representative in the American meat packing industry of the present time.

Since economic development is not only the result of mechanical forces, but also the work of men who have directed

the mechanical elements themselves, there is profit in sketching at this point the significant features of the lives of several of the builders of the modern packing industry. In doing so, representatives have been chosen who may be considered as typical of many other pioneers whose names do not appear, since this book deals in the main with the meat industry as an economic growth rather than with the biographies of individual packers.

While it is not possible to treat of these representative builders of the packing industry in strictly chronological order, it may be said that one of the very first of those men who founded one of the great modern firms was Jacob Dold. The Jacob Dold Packing Company, one of the more widely known meat packing companies in the United States, was a pioneer firm which has had a continuous development, with constantly growing traditions, unlike many of the earlier firms whose names have not been preserved.

Jacob Dold's Success

Its founder, Jacob Dold, was born in Wurtemburg, Germany, where his family had been for generations in the meat business. At 10 years of age he helped his father in slaughtering and in sausage making, afterwards becoming apprenticed to the largest butcher in his native town. At 16 he was given the duties of stock buying and at 22 had mastered the details of abattoir management.

In 1848 young Dold came to the United States and settled in Buffalo, where for three years he worked at his trade as a butcher. Then he began in business for himself with his savings. At first he made sausages in small quantities and peddled them from house to house. His trade soon increased to such an extent that he was obliged to buy a horse. In 1852 he sent for his father, mother, brothers, and sisters—six in number—and shortly after they came he built his first slaughter house, which had a capacity of ten hogs a day. By energy,

enterprise, and economy he acquired an extensive trade. His sausages became well known. In 1860 he had to enlarge his plant, and so put up a three-story brick building, combining a meat market, dwelling rooms, and abattoir. With the Civil War the food resources of the North were taxed to support the needs of the army. Dold received government contracts which gave his business its first real impetus, and from that time on his progress was phenomenal.

Cordukes, Sinclair, and Kingan

Another noted pioneer in the meat packing industry came from Ireland, long famous for its hams and bacon, where he had built up the greatest business of that kind. Its meat curing establishments date back several generations. Early in the fifties, Cordukes, of the firm of Gilmore and Cordukes, a leading pork packing establishment in Belfast, conceived the idea that "the hog had a future." He made a trip to Denmark and to Hamburg in Germany, but not being satisfied with the situation in those countries, he decided to try "the States." So he came to America and brought with him to Cincinnati some of his most skilled workmen. The chief business of many packers at that time was not slaughtering, but cutting hogs into Cumberland long ribs, long and short cut hams, and various other cuts. Cordukes' firm in Belfast had been catering for years to the English trade, and he was able to ship an article which pleased the English market. The Cincinnati industry received a great impetus as a result. The example of Cordukes was followed by several other pioneer firms, such as W. P. Sinclair and Kingan and Reid.

The career of Samuel Kingan, also of Belfast, is particularly interesting, because he founded a firm which is today large and flourishing. He, with his two brothers, came to Cincinnati in 1852 and built a pork packing establishment. Later they removed their headquarters, as did some others, to Indianapolis. Soon they had plants and houses throughout

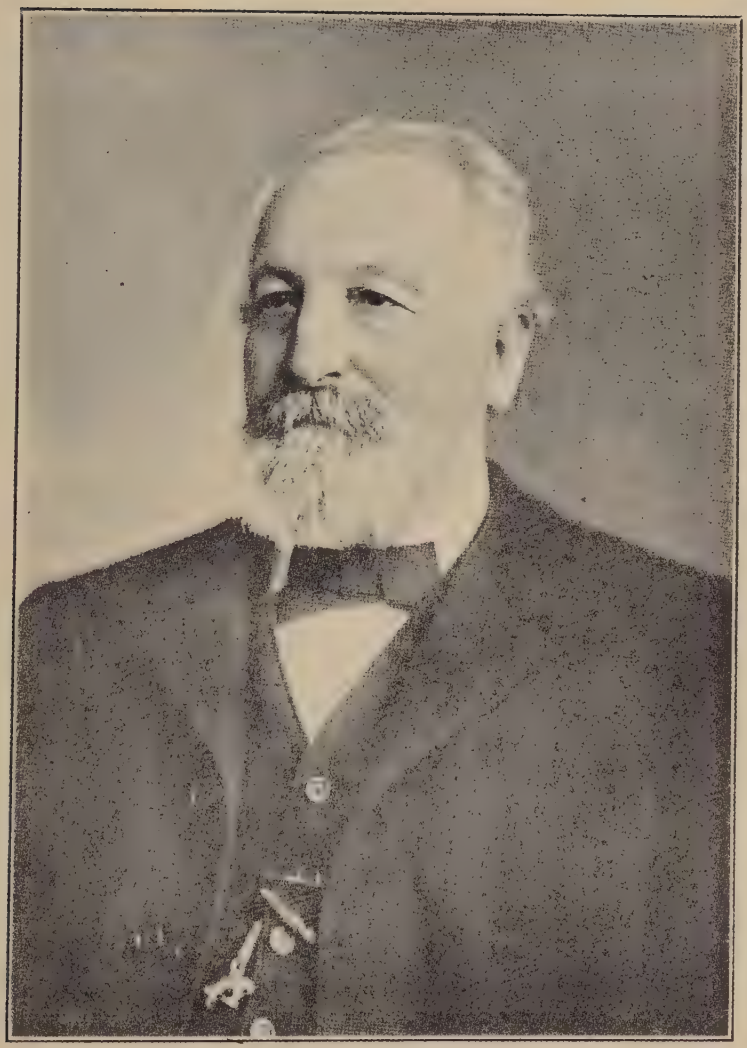

Figure 3. Jacob Dold

the United States and Great Britain. Samuel Kingan himself remained in the United States for about sixteen years, when he returned to Belfast and directed the affairs of the whole business from that point.

John Plankinton's Influence

Still another packing enterprise which has become widely known throughout the United States began at this time. John Plankinton came from Pittsburgh, Pennsylvania, to Milwaukee, Wisconsin, on September 8, 1844. Plankinton's object in going to Milwaukee was to enter the butcher business with George Metcalf, whom he had previously known. This plan, however, was frustrated by the fact that Metcalf had entered into another partnership, which compelled Plankinton to launch out for himself.

Accordingly, he leased some ground at a rental of $60 per annum, erected a small frame building, at a cost of $100, and opened a meat market with a capital of $450. Such was his success that his first year's sales amounted to nearly $12,000.

Here he remained until 1849, growing in wealth and experience, when, the country having been well stocked with cattle and hogs, he commenced a slaughtering and meat packing business. This he continued for one year, when a partnership was formed with Frederick Layton, under the firm name of Layton and Plankinton. The slaughtering was principally confined to cattle, as the hogs were mostly killed by the farmers themselves at that time. In 1860, the partnership was dissolved, Layton retiring and the business being conducted by Plankinton alone until 1863, when there were but three establishments of its kind in the United States whose business was larger.

Philip D. Armour

By this time it was patent to Plankinton that the business he was engaged in would soon be the leading enterprise of the

West, wheat alone excepted, and he was seized with a desire to develop it further. In order to effect this, a new partnership was entered into with Philip D. Armour, then a rising young man, under the firm name of Plankinton and Armour, and under this name the firm soon began to make its power felt.

The name of Philip D. Armour has since become widely known, not only in the packing industry in the United States, but in the commercial world generally, from Europe to Australia, as that of one of the greatest modern merchants. He was born on a farm near Stockbridge, New York, on May 16, 1832, of Scotch-Irish Presbyterian stock.

He was a natural leader of his schoolmates. In his twentieth year he joined a party going to California gold fields, he starting on foot, with $100 in cash, in the company of three other men. The journey took six months. One of the party died and two turned back, leaving only the 20-year-old boy to achieve the goal.

With too fixed a purpose to yield to the temptations of a merely adventurous life, Armour on his arrival in California wisely decided, to use the phrase of Elbert Hubbard, "that he would not bet on anything but his own ability." Therefore, he did not dig for gold himself, but set to work to dig ditches for men who had mines but lacked water. Armour's plan lacked glamor or excitement, but was solid. At first he was paid $5 a day, later he took contracts for ditches and soon had a number of men working for him. In five years of steady work he saved $8,000. With this sum he made his way back to New York.

The story goes that on the journey east he began to be interested in the possibilities of the livestock and grain of the western country for feeding the populous areas of the East. At any rate, the California experience broadened his views and strengthened his character. It turned his thought to the chance of making his fortune as a merchant.

Figure 4. Philip Danforth Armour

Armour's Start in Milwaukee

On his way back from California he had journeyed along the Great Lakes and had spent a short time at Milwaukee. This city, in those days, was a growing place as the gateway of the West and the natural market where vessels loaded for the East. The one rival of Milwaukee was Chicago, some 85 miles to the south. Chicago, however, though at the head of lake navigation, was on low, flat, marshy ground, and it was conceded that Milwaukee would be the great future port.

After a long visit at his old home in Stockbridge, accordingly, Armour went to Milwaukee. His first venture was in the grain, produce, and commission business in March, 1859, in partnership with Frederick B. Miles. Each man put in $500 and the business prospered beyond their hopes, supplying produce and meats to the multitudes that streamed into Milwaukee, westward bound.

This partnership was dissolved in 1863, not because of any decline in business, which was very prosperous, but because at that time John Plankinton invited Armour to become his junior partner under the firm name of Plankinton and Armour. Armour and Plankinton continued as business associates with great success for many years. Plankinton had been long a resident of Milwaukee. He had a thriving business, he stood high as a merchant, and he commanded general respect as a public-spirited citizen. Uniting in business with such a man was a fine opportunity for the exercise of Armour's powers of organization.

Extension of Plankinton and Armour

Having means, as well as credit and brains, Plankinton and Armour at once took the initiative in the slaughtering and packing of beef and pork, increasing their facilities yearly, as their business increased, until their Milwaukee establishment alone covered 9 acres of ground, and had a capacity for handling from 5,000 to 7,000 hogs daily, their average being

30,000 per week when in full operation. In addition to this plant they built a branch in Chicago of even larger size, and one at Kansas City, for cattle slaughtering alone, in which from 40,000 to 60,000 head were slaughtered annually. In all three establishments their business for 1880 exceeded $12,000,000.

Armour developed even more successfully on the merchandising side. During the Civil War and after, his careful attention to the causes of changes in the price of provisions made a fortune for the business. Its war contracts for pork products were very large. The end of the war found it in a strong position and well stocked with large orders for mess pork, sold for future delivery at wartime prices. These contracts the firm filled at a much lower cost, with a very satisfactory financial reward.

In the meantime the city of Chicago was growing faster than Milwaukee, aided by the rich country to the south and west. As time went on it became clear to young Armour that Chicago was destined to be the metropolis of the Middle West. It was already a better market than Milwaukee for pickled beef and corned beef; more boats were fitted out in Chicago and more emigrants were passing through on their way to take up government land. Even before Armour had joined Plankinton, he had, together with his brothers, Herman O. and Joseph F. Armour, established a grain commission business in Chicago, and by 1856 he was convinced that his best interests would be served by establishing a meat packing plant there also.

Armour and Company at Chicago

The Union Stock Yards in Chicago had begun operations in 1865, and two years later, Armour and Company began packing hogs under that firm name. At first hog packing was the exclusive business of the firm, but in 1868, Armour and Company began killing cattle, and two years later, sheep were slaughtered. New markets were developed under Armour's

direction in all parts of the country, in order to take care of the trade which was so rapidly growing with the increase in population and with the betterment of facilities for handling meat and meat products. Armour played a large part in the development of those facilities. His work in furthering the perfection of refrigeration, both natural and artificial, was particularly noteworthy and is responsible for a great deal of the prosperity which the packing industry has had, and which has, in turn, been reflected in agriculture.

With these years there came a country-wide branching out of the Armour interests, a development which was greatly aided by the fact that P. D. Armour had the co-operation of several able brothers.

Although Herman O. Armour had established himself in the grain commission business at Chicago in 1862, he was induced by Philip to surrender this to a younger brother, Joseph F., in 1865, and to take charge of a new firm in New York, then organized under the name of Armour, Plankinton and Company. The organization of the New York house was timely and successful. The financial condition of the West at that period did not permit of the large lines of credit necessary for the conduct of a business assuming such magnitude. It was, therefore, fortunate that the duties devolving on the head of this house should come to one eminently qualified to handle them. H. O. Armour thus became the eastern financial agent of all the company's western houses.

A Family of Able Merchants

The firm name of H. O. Armour and Company at Chicago remained unchanged until 1870. The firm continued to handle grain and pack hogs, the latter part of the business being conducted under the firm name of Armour and Company. In 1870 Armour and Company took over all the Chicago operations. The business of all these houses grew to dimensions considered phenomenal by the trade, and their brands became

well known in all the markets of the world. In all these developments in the industry Philip D. Armour was the dominant spirit.

It became evident to Armour in 1871 that the livestock producing power of the country was rapidly migrating westward, and in order to keep abreast of it he established at Kansas City the firm known as Plankinton and Armour, under the immediate supervision of an elder brother, Simeon B. Armour. The total output of the Chicago, Milwaukee, and Kansas City houses under the vigorous leadership of the three brothers was enormous. The failing health of Joseph at Chicago necessitated assistance. Consequently Philip moved to Chicago in 1875, where he resided until his death in January, 1901, and where the further great expansion of Armour and Company during the next two decades took place under the direction of his son J. Ogden Armour.

In 1879 Armour induced another brother, Andrew Watson Armour, the last one to leave the old homestead at Stockbridge, to remove to Kansas City to take charge of the Armour Brothers' Bank. This change led afterwards to the admission into the Kansas City packinghouse of the sons of this brother, Kirkland B. Armour and Charles W. Armour, who became the active managers there. Large plants were later established at Omaha, Sioux City, East St. Louis, St. Joseph, and Fort Worth. Joseph Armour died in January, 1881, A. W. Armour in May, 1892, and S. B. Armour in March, 1899. In August, 1901, H. O. Armour died, and in September of the same year Kirkland B. Armour. His sons, Watson and Laurence, have since entered the business and taken part in the Chicago management. Later Philip D. Armour, III, the grandson of the founder of the house, also entered the management, and is now vice-president, working directly with President F. Edson White, who became president of the company on the retirement of J. Ogden Armour from that office.

Figure 5. J. Ogden Armour

Armour By-Products and Beef

As a manufacturer, P. D. Armour was constantly seeking greater economy and efficiency, by preventing waste. It was found that many articles that previously were either removed at expense, given away, or sold for trifling amounts, could, by good handling or by mixture with other suitable raw materials obtained for the purpose, be made into glue, curled hair, ammonia, and above all into fertilizers, which have almost revolutionized agriculture. As a merchant Armour was quick to see and utilize new outlets for all his products by furnishing them to consumers at the lowest possible prices, with guarantee of excellence.

In the years just previous to 1881 a new method was developed for handling beef for the eastern markets. After a number of years of experimentation cattle which had formerly been slaughtered and dressed at their destination were killed at western points, and the dressed product shipped successfully in refrigerator cars to eastern dealers. This required a large outlay of capital and could be successfully carried out only by doing a large volume of business. On the other hand, the new method reduced to a minimum the cost of handling. The house of Armour and Company became one of the leaders in this trade.

P. D. Armour's capacity for work was exceptional. He was at his desk by six o'clock in the morning or earlier. Fatigue was an unknown experience to him. He traveled extensively, but in the interest always of a wider intelligence. He could then be found usually among those who consumed his products, and where his agencies had been established or new ones created. He was a close observer, with a strong faith in the future. He thus formed clear and accurate forecasts of financial conditions in a growing country. He acted upon them promptly and decisively. His foresight in estimating the agricultural products of the country, in both supply and demand—notably provisions and grain—was remarkable.

P. D. Armour inspired respect and affection among his friends and business associates to an unusual degree. Particularly among those connected with the interests which he controlled, loyalty to him and to his wishes was pre-eminent. It inevitably was a large element in his progress. He could always count upon the co-operation of his men.

Rise of Nelson Morris

About the same year, 1859, that P. D. Armour began in the grain business at Milwaukee, a man who was to be one of his chief rivals in the packing business, built the first packinghouse near the present Union Stock Yards, in Chicago, and established a meat packing business. This was Nelson Morris, founder of Morris and Company, who started in a very small way, handling all details of buying and selling. He knew from actual experience the principles of marketing live-stock. After the establishment of his first cattle slaughtering plant, he continued almost exclusively in this line until 1879, when he erected one for hog killing and began buying hogs regularly on a large scale. From his first little slaughtering establishment there developed by the time of his death in 1907 a plant at Chicago which covered 30 acres and included 40 buildings, with a daily capacity of 5,000 cattle, 1,000 calves, 10,000 hogs, and 10,000 sheep. There were, in addition, plants in several other cities doing a business of over $100,000,000 a year.

Nelson Morris was born on January 7, 1840, in Hechingen, Germany, in the heart of the Black Forest. His parents, people of means and standing, had met with misfortune and became exiles as a result of the German revolutionary movement of 1848. At the age of 11 Nelson Morris landed in Philadelphia, without a friend and without a dollar. He walked to New York and got his first job as a charcoal hauler at Lakeville, Connecticut, at $5 per month and board. Later he worked his way on a canal boat to Buffalo, changed there

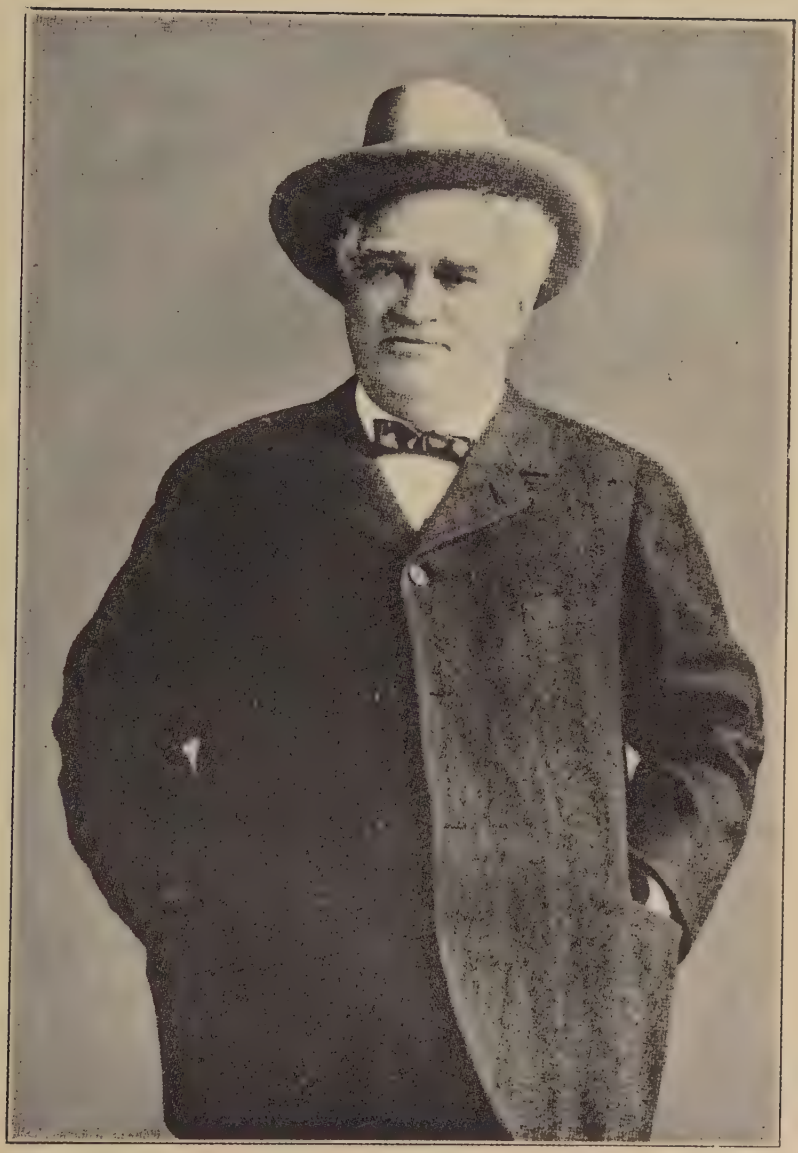

Figure 6. Nelson Morris

to a lake schooner, and went to Michigan City, Indiana. From that point he walked to Chicago.

At Chicago his first work was caring for livestock at the old Myrick stockyards at 29th Street and Cottage Grove Avenue, which has already been mentioned and which were then owned by John B. Sherman. It is said that the very day Sherman gave him a job Morris had decided to work his way back East, thinking there was nothing for him in Chicago, but before he had worked for Sherman a month he had caught a glimpse of his future. He soon began to buy cattle and hogs and started in the cattle business. He had many reverses to overcome, but he persevered to ultimate success.

Morris and the Cattle Trade

The first large venture of Nelson Morris in the meat packing business was when he was 22, in the early days of the Civil War. He also began shipping cattle to the East by rail, and started what was later to be the greatest cattle exporting business in the world. His first great success was the obtaining of a contract from the federal government to supply the Union Army with cattle and beef. One contract called for 20,000 head of cattle for the eastern armies, and he had also a contract to supply all the beef for the army in the West. His success in filling these contracts was the foundation of his future rapid progress.

With regard to the export cattle trade, Nelson Morris stated in 1885 in a letter in response to a government inquiry into the development of the cattle business, that he was the first exporter of live cattle from the United States to Europe. He pointed out that he had exported a few cattle to London and Glasgow in 1868, but that there were many difficulties connected with this trade in its early stages, although by 1885 the mortality averaged less than 1 per cent.

Indeed, Nelson Morris, besides being a packer and an exporter of live cattle, was a great cattleman and was known

as such all over the world. His ranch and cattle interests were proportionate to his packinghouse investments. He was interested in many livestock enterprises and did much good work in breeding. At the end of his life he, himself, owned one ranch of 300,000 acres in Texas, one of 30,000 acres in Indiana, and one of 30,000 acres in Nebraska. He was the greatest feeder of distillery cattle in the world and a pioneer in this particular branch of the livestock business.

These two men, Armour and Morris, were the first of the large packers to begin operations in Chicago. Keen competitors' rivalry gave them added zest and played no small part in the future development of their companies. A story given currency by Elbert Hubbard in his entertaining little sketch of Philip Armour in the series "Little Journeys to the Homes of Great Business Men," throws an interesting light on the relations of Armour and Morris.

Armour and Morris Competitors

Two peculiarities of P. D. Armour were that he refused to own more land than he could use, and that his only stimulant was tea. Tea seemed to stir his mind to greater activity. With so much personality and magnetism Armour had few important competitors, but one of the few was Morris, and Armour was unable at times to understand the able Bavarian Jew.

Morris in his early years bought hogs in the yards at 4 A. M., or as soon as it was light. Armour himself was early, but he found as a rule that Morris was ahead of him. Morris was by very energetic methods giving Armour a stiff run, and the situation perplexed the latter. He decided to take active steps to get ahead of his competitor. As a result it happened that one morning at daylight Morris when he arrived at the stockyards, found all the pens empty, for Armour had been going around with his hog buyers all night hunting up the owners and bulling the market. Morris said nothing, but the

next week trainloads of hogs were being shipped to Chicago, consigned to Nelson Morris. He had sent his own agents out into the country and was buying from the producers direct.

Soon after this incident Armour casually met Morris and suggested that they lunch together. Morris agreed and so they did. Morris ate very little. Both men talked, but said nothing. They were waiting. Although Morris ate little, he drank three cups of tea. Armour insisted on paying the check, excused himself somewhat abruptly, and hurried to his office. He sent for his lieutenants. They came quickly and Armour said, "Boys, I've just lunched with Nelson Morris. I think we'd better come to an understanding with him as to a few little things we shall do and a few we shall not do—he drinks nothing but tea." But the competition waxed instead of waned as years went on, until in 1923 Armour and Company bought the physical assets of Morris and Company.

G. F. Swift's Early Life

Another man who came from the East to build a great meat packing business in Chicago was Gustavus Franklin Swift. He was of English stock, eighth in descent from William and Elizabeth Swift, who came to Boston in 1630 from the county of Essex, England. The Swifts settled finally on Cape Cod in the oldest township, Sandwich, near Plymouth. They were leaders in the life of the community of farmers and increased in numbers, until, as Freeman in his history of Cape Cod writes, "the Swifts were like the stars for multitude." It was in West Sandwich or Sagamore, that G. F. Swift was born on June 24, 1839, the ninth child and fifth son among twelve children of William Swift, a farmer.

Very early the boy gave evidence of a genius for business. At 14 years he struck out for himself, becoming apprentice to the local butcher for seven years at $1 a week, but he was too energetic to stay long as an apprentice, and at the end of four years he bought the remaining time with his note for $1,000.

His next venture was in killing and selling meat in the village, at which he soon acquired a reputation for neatness. This work was interspersed with trips to Brighton Market near Boston with pigs and cattle. In 1859–1860, with his brother Nathaniel he went to Easton, a little town nearby, and opened a butcher shop. Here in 1861 he married, and shortly after, to leave the local field open to his brother, he moved to Sagamore, where he opened a butcher shop and slaughter house and where his son, Louis F. Swift, now president of Swift and Company, was born. Another brother was a butcher in Sagamore, and the generosity of G. F. Swift again showed itself through his removal of his own business to Barnstable.

A Successful Cattle Dealer

The position of a local butcher in a town of less than 1,000 people did not content Swift. While studying how he could better himself he considered the difficulty the farmers on Cape Cod had in marketing their cattle. Soon he was buying and selling cattle. In a short time this became his real business and he was no longer a village butcher, but a cattle dealer.

The story is told in Charles Winan's "Evolution of a Vast Industry" that G. F. Swift's first business venture was when his father loaned him $20 with which he bought a heifer, which he killed and dressed himself. He peddled the meat around Barnstable and made a profit of $10.

To carry on his cattle business, Swift moved next to Lancaster, some 40 miles northwest of Boston. By this time he was buying cattle all over New England and taking them to Brighton stockyards. In 1872 he entered into partnership with Henry Hathaway, who had had a local dressed meat business in Boston, under the firm name of Hathaway and Swift. Swift was in charge of the buying end of the business and extended his operations to Albany and to Buffalo to tap the ever-increasing supply of western cattle from the ranges.

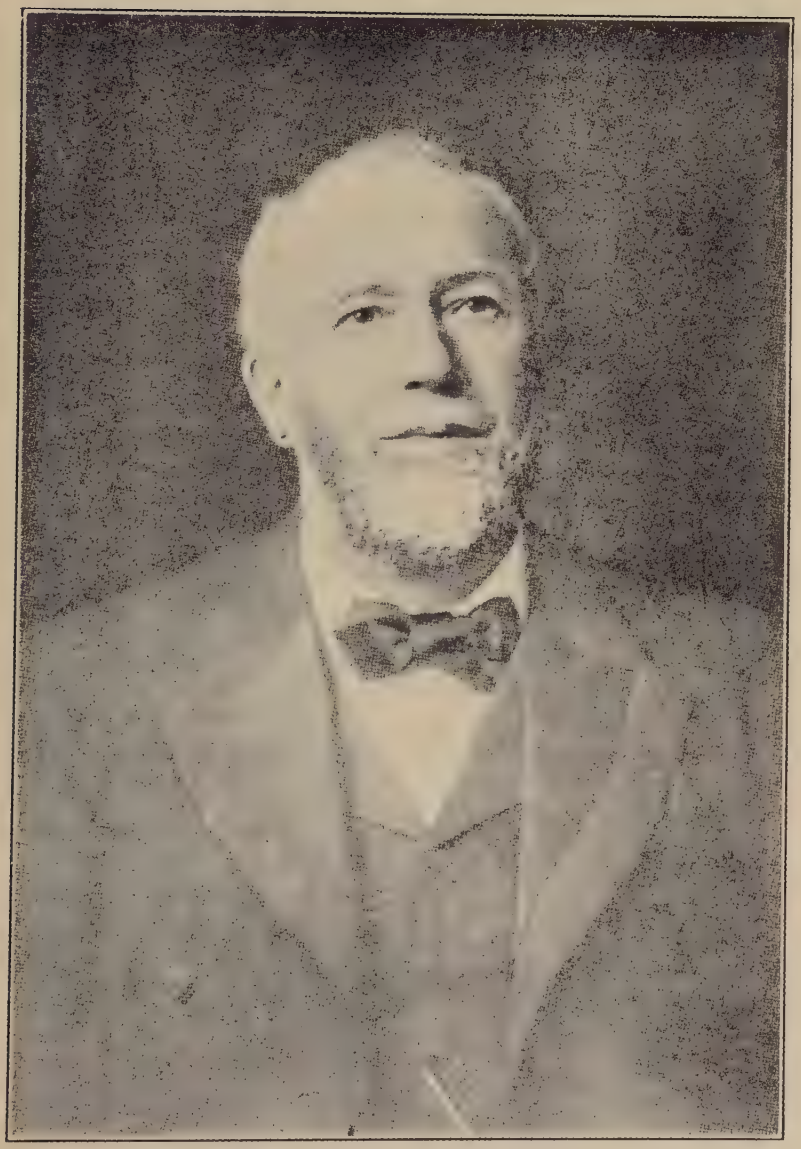

Figure 7. Gustavus Franklin Swift

While living in Albany and Buffalo, Swift was apparently studying carefully the whole matter of livestock marketing. He must have decided that Chicago, already the most important livestock market in the country, was to become more and more the center of the American cattle business. He saw that to be a leader in the cattle business he must locate in Chicago. He therefore proposed to his partner, Hathaway, that the cattle buying be transferred to that city. His partner was skeptical, but in 1875 Swift went to Chicago as a cattle buyer in the Union Stock Yards.

Swift Becomes a Packer

Swift did not begin as a packer, but he soon saw that cattle buying was only an incident to the meat business and it was not long before he purchased "Billy" Moore's slaughter house in Chicago and began a packing business. By an interesting coincidence, this was in the same year as P. D. Armour moved his permanent residence to Chicago from Milwaukee. Armour was 43 years of age, seven years older than Swift. He was rich and had had packing interests in Chicago for several years. The sole advantage Swift had was youth.

The new business Swift developed was the preparation of dressed beef at Chicago and the sending of it to eastern markets, which inaugurated a new or modern era in the packing industry and made possible its development on the great scale of the present time. This story of the rise of the dressed beef trade, one of the most dramatic in commercial history, is treated in a later chapter. The great growth of the dressed beef business, with the resulting by-product industries, was due to the refrigerator car. While Swift did not invent this car and was not the first to use it, he was one of the greatest factors in making it a commercial success.

Regarding this work of G. F. Swift in initiating the dressed beef trade on a national scale, Charles Edward Russell in a

series of articles in *Everybody's Magazine,* in 1905, remarks as follows:

> As soon as it was discovered that Mr. Swift was right, a great revolution passed over the meat and cattle industries and eventually over the whole business of supplying the public with perishable food products. The other packing houses at the stockyards went into the dressed beef trade, refrigerator cars ran in every direction, shipments of cattle on the hoof declined, the great economy of the new process brought saving to the customer and profit to the producer, and the new order began to work vast and unforeseen changes in the life and customs of the nation.

Hard Work and Slow Growth

The early years were years of slow growth. As Louis F. Swift, present head of Swift and Company, has said:

> I can remember when my father bought all the cattle we handled and he did not need any help. Then came the time when he had to go to the packinghouse and offices, and I took up the buying and did all of it. My five brothers followed me. I well remember when we were able to ship one whole car of beef in one day. It marked an epoch in our business.

In these first years many prophesied Swift's failure, and it was a constant struggle for several years. Yet each year found him with an increased business. In 1885 the firm was incorporated as Swift and Company, with a capital of $300,000. From that time on the increase was rapid, and in 1887 the capital was raised to $3,000,000. Today it is $150,000,000.

This progress was made possible by extraordinary financial ability and daily overtime toil. As his biographer, Dr. Goodspeed, has said:

> He was matched against some of the ablest business men of his day, or for that matter, of any day, all of whom were struggling for supremacy in what was a new industry in the world of business. They drove each other to well-nigh superhuman efforts to carry their products around the globe. The out-

Figure 8. Louis F. Swift

standing illustration of this is the successive establishment of branch plants. The first branch of Swift & Co., was established in 1888 in Kansas City, Mo. Two years later the Omaha branch followed. In 1892 another was built at St. Louis. Then followed St. Joseph, Mo., in 1896–97; St. Paul in 1897 and Fort Worth, Texas, in 1902.

These were all fully equipped packing plants, each of which developed into a great business, but they were in every case opened only after the most thorough and exhaustive examination, in several instances carried on by G. F. Swift personally.

An Organizing Genius

In meeting the demands of a constantly expanding business G. F. Swift's financial and inventive genius was taxed to the utmost. At every stage he grew in his power to borrow large sums of money, to improve the equipment of his plants, to find new markets for his products, and to increase the efficiency of an ever larger business organization. G. F. Swift was a great administrator. For he had a mind that was both microscopic and telescopic. He kept in touch with details such as the color of the paint on his wagons. In his letters to his representatives he was always explicit and usually closed with these words: "Please answer and say you have carried out these instructions."

The real reason for Swift's success lay in his personality. This has been summed up by his biographer as follows:

> His talk was that of any ordinary man of business, but his face took me wholly by surprise. It was not the face of a typical business man, but that of a scholar, or a poet, or an artist. It looked like the face of a man who might see visions and dream dreams. And his fundamental characteristic as a man of affairs was his business imagination. From his youth up he was always seeing possibilities that other men could not see. He was like an explorer in a new country. Every step in advance opened up new vistas. Every new achievement gave him a vision of something bigger beyond. He was a man of business vision. But his visions were not of the "baseless fabric" sort.

> His idealism was of the most severely practical kind. His business imagination never played him false. It might soar among the clouds but his Cape Cod conservatism kept his feet firmly on the ground and he walked with sure steps to his high achievements.

Michael Cudahy's Work

In the days when Swift and Armour were developing their great companies, still another was directing the production operations for Armour and Company at the Chicago stockyards, who was later to found what is today one of the five largest packing companies in the United States. This man was Michael Cudahy. He was, like some of the older pioneer packers, Kingan and Cordukes, an Irishman. Born in Callan County, Kilkenny, Ireland, in 1841, he came to America with his parents in 1849 and made his home in Milwaukee. It was there he got his first experience in the packinghouse industry. When 14 years old he entered the employ of Layton and Plankinton in Milwaukee, and later worked for another packer, Edward Roddis, until 1866, when the business was closed out. In 1866, he became private meat inspector for Layton and Company, and three years later became superintendent in charge of the packinghouse of Plankinton and Armour at Milwaukee. The whole plant at that time was worth only about $35,000. Cudahy's ability was such that in a few years P. D. Armour offered him a partnership in the firm of Armour and Company, in Chicago. Cudahy took charge of the stockyards part of the business. Years afterwards, in 1890, he withdrew and with his brother, Edward A. Cudahy, formed The Cudahy Packing Company.

While in Milwaukee Michael Cudahy showed his initiative in introducing new processes and methods. Among them was his introduction of the summer packing term by storing ice in cribs and bringing about a low temperature which made practically winter conditions for packing meats.

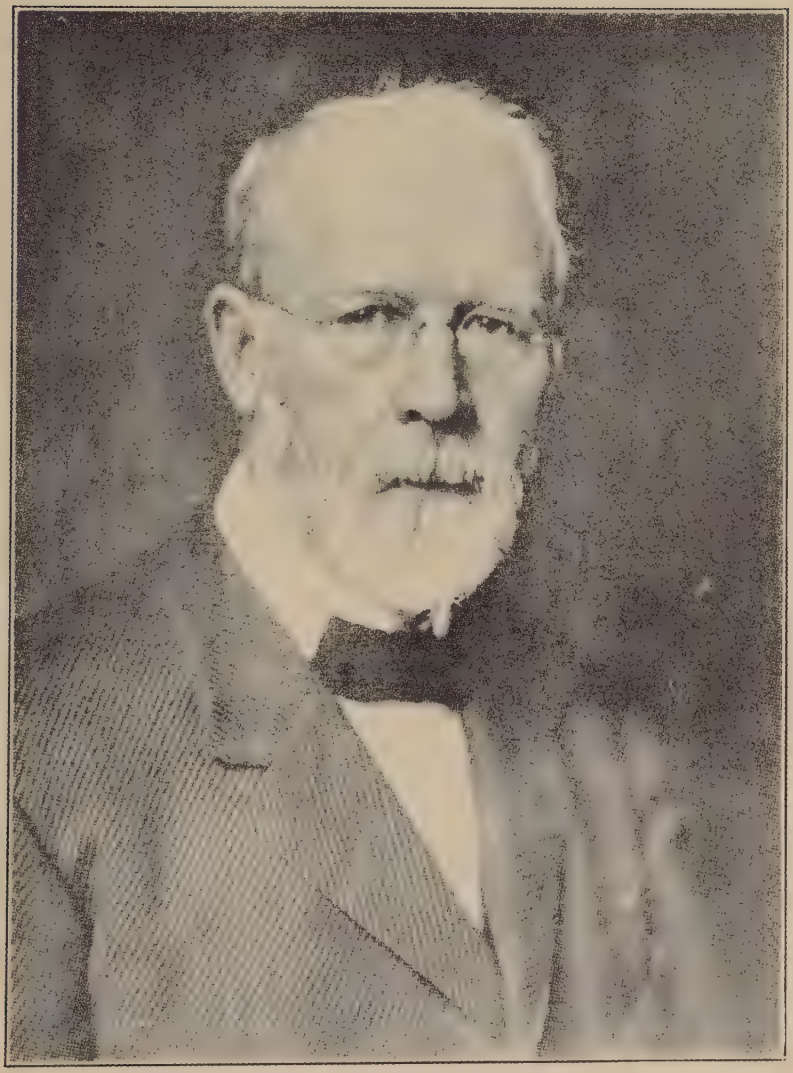

Figure 9. Michael Cudahy

The Cudahys Go to Omaha

The Cudahy Packing Company began business in 1887 under the name of the Armour-Cudahy Packing Company, when Michael Cudahy, Edward A. Cudahy, and Philip D. Armour, of Chicago, purchased a small packing plant in South Omaha, Nebraska. In 1890, Michael Cudahy sold his interests in the firm of Armour and Company and purchased the interests of Mr. Armour in the Armour-Cudahy Packing Company, the name of which was subsequently changed to The Cudahy Packing Company.

Michael and Edward A. Cudahy went to Omaha at a moment which could not have been better chosen for their own fortune and the development of the packing industry. There were in Omaha in 1887 only two small packers, whose business was for the most part confined to packing for the British market, but this was not the best outlet for the rapidly increasing supply of livestock which was really better adapted to the domestic market. This was more especially true of hogs. The Cudahy brothers very shrewdly saw the opportunity to be developed in packing for the domestic market. In this course they were amply justified, and were later able to develop a foreign outlet on a large scale as well.

Within thirty years the business and property of the company have grown from a single plant, employing 700 operatives, with an annual pay-roll of $300,000, to 8 plants, with a floor area of 110 acres and cold storage floor area of 25 acres, with a slaughtering, curing, and preparing capacity for 15,000 hogs, 4,000 cattle, and 10,000 sheep per day, employing about 9,000 men, with an annual pay-roll in excess of $10,000,000.

Present Heads of Large Packing Companies

The packers whose lives have been sketched thus far have all passed on their great industries to others of their family. It is not the purpose to dwell here on the achievements of the present heads of these organizations, except to say that they

have in some cases exceeded the abilities of their predecessors and in other instances have been able to build far beyond the aim of the first generation. J. C. Dold, J. Ogden Armour, Louis F. Swift, Edward A Cudahy, Nelson and Edward Morris, and others have done much for the further development of the packing industry of the country.

Thomas E. Wilson

Outside this group of pioneer builders stands a man who illustrates, however, certain new developments in the industry, namely, Thomas E. Wilson, president of Wilson and Company and formerly president of Morris and Company. The story of his rise shows the development of qualities of a born administrator similar to those of the older generation of Swift and Armour and Morris.

Thomas E. Wilson was born in London, Ontario, on July 22, 1808, of Scotch-Irish extraction. His father had accumulated a moderate fortune in drilling oil wells and running a refinery. When the boy was 9 years of age the family moved to Chicago. After passing through the primary and high schools of Chicago young Wilson found himself unable to go to college, since his father had met with financial reverses, so he had to look for a job. The job he got after a long hunt was a minor clerkship in the head office of the Chicago, Burlington and Quincy Railroad at $40 a month. There were other places to be had and some at higher wages, but as young Wilson expressed it, he wanted to get himself identified in some way with a big concern like a railroad so that when he got to the top it would be worth all the trouble of making the climb.

One day in 1887 the chief clerk of the Burlington was asked by Nelson Morris and Company to send them a young man to keep the records of their refrigerator cars. He picked his chief assistant as the man he felt was best qualified for the job. After an hour's visit to the stockyards the assistant returned to the Burlington office, announcing that if he were

Figure 10. Thomas E. Wilson

offered the whole stockyards he would not go there to work. The salary of $100 a month, however, which had been mentioned, struck young Wilson as being a desirable thing to get. So the 19-year-old youth asked if he might go out and look over the possibilities. He received permission and went.

Wilson Starts With Morris

In a recent interview with B. C. Forbes, Mr. Wilson described his first trip to the stockyards as follows:

> I found that conditions at the stockyards were not exactly salubrious. . . . . Everything was crude and rough and uninviting—quite different from the sanitary conditions of today.
>
> But there was no lack of business. It looked as if a fellow could find a lot to do. I thought I could see an opportunity for anyone willing to work and to stay by the proposition. The prospects appealed to me and so I accepted the job.

Wilson's first work was making records of the railroad mileage of both refrigerator and stock cars. This was necessary, since the railroads paid the packers for the use of the cars; but he did not spend all his time in the office. Soon he was putting in a good deal of it in the yards, taking an interest in the actual handling of the cars and becoming familiar with the car repairs. As a result he was placed in charge of all car repair work.

When the company began building its own cars, Wilson was given the management of this development. In a short time he trained another man to take his place as manager of car construction, and he, himself, took over the headship of the purchasing department for the whole plant, which entailed buying supplies of all kinds, machinery, and construction material.

Building Branch Houses

This phase of the company's activities involved also the necessity of travel in order to supervise construction of the

growing branches of Morris and Company. As time went on Wilson added to his duties the task of locating new branch houses and selecting men to run them. For example, one whole winter he spent in New England with Boston as his headquarters, and as a result he covered that territory with branches.

He would go to a town and investigate to see what Armour, Swift, Hammond, and other packers were doing, and if he thought the place would stand another branch, he would buy or rent property. He would then outline to the drafting department the kind of layout wanted and get a rough plan, which he revised and embodied in a final plan with specifications. With three or four construction men Wilson would supervise the special work of putting the branch into operating trim. Finally he chose a local manager.

Following this experience in construction Wilson was given the management of the company's general construction work. Soon all the superintendents were put under Wilson who supervised both the manufacturing and the construction work. The company was growing and when Frank Vogel, who was the "and Company" of Nelson Morris and Company, retired from the business, Edward Morris, the eldest son of Nelson, took Thomas E. Wilson, who was then 32, into his office. In 1906 Wilson became vice-president and finally on the death of Edward Morris in 1913 he became president.

He did not remain long at the head of Morris and Company, however, for it had been the desire of Edward Morris, who had ably maintained the organization his father founded, that his sons, Nelson and Edward, should be trained to run the business. This Mr. Wilson felt was right, and he himself had an ambition not to remain an employee all his life.

A Leader in His Industry

In 1916 Mr. Wilson's ambition was realized. During the preceding autumn, some New York bankers made him an offer

to take charge of one of the best-known packing companies in the country which had its headquarters in the East—Sulzberger and Sons Company. Ferdinand Sulzberger, who had done much to build up the organization and was a very able packing-house executive, had been inactive for several years, and died in 1913. The business had been carried on by his two sons and they had made an arrangement for refinancing the company by certain New York banking interests. These interests, having got control, wished to have the property built up and developed in the best way, and they came to Wilson.

Though their first offers were declined by Mr. Wilson, he was finally induced to accept, by being given a very substantial interest in the business with a large salary. As a result the name of the company was changed to Wilson and Company. Mr. Wilson soon built up a very efficient organization and at the same time began to develop a closer co-operation among the meat packers of the United States through the Institute of American Meat Packers, as well as between the livestock producers and packers. This brought him to a commanding position of leadership in the entire industry and made him a public figure in the life of the nation. He exemplifies, indeed, a capacity to translate visions into realities that was characteristic of the earlier builders of this industry. A later generation of packers has paid tribute to these builders, stout-hearted and clear-eyed, who toiled as men must toil who would create, who changed disorder into order, and placed the packing industry where it stands now, as an eliminator of carelessness and waste and a servant of the human race.

PART II

THE REFRIGERATION PERIOD

CHAPTER VIII

THE WESTERN RANGE CATTLE INDUSTRY

New Beef Supply in West

About 1870 was the beginning of the second era in the history of meat packing. One might say that not until then was it struck by the forces of industrial revolution. These were working both on the production and distribution sides of the industry during the decade 1870–1880. The result is the meat packing industry in its modern form as we know it today.

It is a source of continual interest how, just at the time a new need arises, a new source of supply usually comes to hand. That is what happened regarding the raw material of this industry. Up to this time packing had been mostly associated with pork products and was a local business in the main. From 1870 it became also in large measure a beef business and national in its scheme of distribution, changing entirely the meat industry of America.

During the five-year period following the Civil War, several significant factors combined to revolutionize the beef cattle business in the United States. Rapid increase in population and the development of manufacturing industries in the East and North had brought about a new demand and a larger outlet for beef. At the same time, as has been noted, railroad extension throughout the Middle West made possible the establishment of central livestock markets, which became accessible to beef cattle producers at long distances.

But for the meat industry to develop there had to be a new supply of livestock. That was found in Texas and the great Southwest. It cannot be said, however, that there was already

an organized range stock business in Texas, which had merely to be extended more widely to result in the cattle range industry. Livestock raising until the Civil War was simply intended to meet local needs of beef and mutton and wool. As the animals killed supplied the wants of the mass of the people for hides, pelts, and tallow, the only other outlet was in export to Europe.

Other outlets were later developed even before the Civil War. At the time of the California gold rush the markets of San Francisco and the various settlements proved a source of encouragement. About the same time James Foster began shipping prime beef steers to New Orleans from Texas ports by steamer. He was a pioneer in shipping cattle by seagoing steamships, and is said to have almost monopolized the output of Texas high-grade steers before the Civil War.

Pre-Civil War Cattle Driving

In 1850 a few Texas cattle were sold in New York,[1] but it was not until 1856 that a definite movement was begun to reach northern markets by driving. Several large herds were trailed into Missouri to St. Louis. This movement was getting well under way when it was interrupted by the Civil War. In the few years before the war railroad development had greatly aided this pre-Civil War cattle driving. For example, in 1857, the Ohio and Mississippi Railroad was extended from Cincinnati to St. Louis. Here it connected with the Missouri Pacific, which was then under construction from St. Louis to Kansas City. Although this latter road was started soon after 1850, it was not finished until 1865. At the same time the completion of the Hannibal and St. Joseph between the Mississippi and Missouri rivers, established railroad service between Kansas City and Chicago.

[1] *The Prairie Farmer* (1885), Vol. XV, pp. 1, 248. They were brought by a Mr. Taylor of Missouri to a Mr. Ranklin of Illinois, who after feeding them brought them to New York by railroad. "They are very peculiar in appearance, having remarkably long horns and looking as though made for the great journey they have performed. The flesh is tough but fine grained and with somewhat of a wild flavor."

The Civil War made great changes in the livestock situation in America. The United States Department of Agriculture's yearly report for 1865 stated that there had been a loss since 1860 in everything except sheep. The great loss had been in the southern states, but, on the other hand, there had been a steady increase in the stock of the Pacific states. The decrease amounted to 7 per cent in cattle and 22 per cent in hogs.

This situation, together with continued wartime prices, induced Texas drovers to revive the movement in Texas cattle northward.[2] The fact that in New York City at the close of the war some 4,940,000 cattle were killed annually, is an index of steadily increasing demand for meat animals.[3] Cattle driving soon became a regular business, and between 1865 and 1880 a total of 4,223,500 cattle, or a yearly average of 281,566, were driven north. Texas, with its constantly increasing supply of livestock, was able to meet the demand for cattle. Its climate was less severe than regions farther north, and although a confederate state, it had not been a base of military movements, and, having been blockaded, had no markets during the war except New Orleans and Mobile, which markets were controlled by the Morgan line of steamships. There had been nothing to retard its growth as a source of livestock. So it was that Texas became known as "pre-eminently the cow country."

However, the Texas supply was not sufficient. Other sources had to be developed, and so as a natural result came the rise of the range cattle industry on the great plains of the West which is, according to Professor Thompson, "the most important and far reaching fact concerning the history of stock raising in the United States after the Civil War."

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[2] An example of the prices of cattle at that time is given by J. G. McCoy in "Sketches of the Cattle Trade" (1874), where the average of 1,200 cost $4.50 per head, or nearly 40 cents per hundred pounds gross weight. An idea of the inflated prices of beef can be had from these figures: beef 8 cents per lb. for 600 lbs., 2/5 of a 1,000-lb. beef being allowed for hides and tallow.

[3] H. Exec. Doc. 39, Cong. 1 Sess., Vol. 15, No. 107, p. 301.

Rise of the Cow Country

Indeed, it was remarkable that this vast area of the great West should be so providentially adapted for stock raising, where millions of cattle could be raised until they were ready for the cornfields of the Middle West to be fattened for market. This region of the great cattle ranges occupied the flanks and valleys of the Rockies and stretched eastward across the plains into western Dakota. It was really made up of three divisions: (1) the Rockies, (2) the Continental Basin, and (3) the Pacific Coast. This wide expanse where the bison used to roam, became the great range and cattle country between 1870 and 1885, and was known after 1870 as "the cow country."

Its success for this purpose was due to three facts: first, the dryness of the climate, which caused the snow to be blown off of the slopes of the hills so as to expose the dried grass; second, the broken nature of the country, affording shelter in "coulees" and ravines to the animals during severe storms, and lessening the violence of the north wind; and third, the admirable qualities of the bunch grass which covered the ranges.[4]

The origin of the cow country was connected closely with four events, the first of which was the Oregon movement; second, the Mormon settlement of Utah; third, the discovery of rich metal deposits in Colorado, Montana, and generally, in the Rocky Mountain region, where mining camps presented a good local meat market; and lastly, the discovery that the apparently arid western plains and valleys possessed in their dried grasses a good cattle food. As a consequence of these four events the ranchers from Texas, in the late sixties, began to drive cattle northward and stock the ranges.

Indeed, the effect of these events, together with better marketing facilities which have been described in a former chapter, and a wide difference in the market price of cattle in

[4] Nimmo Report, p. 73, Appendix No. 1.

the North and in the South, opened a profitable outlet for the southwestern herds.

Cattle Trails to the East

Thus by 1870 three principal routes to eastern markets had developed. One way led by coastwise steamer to New Orleans, whence the cattle were taken north in river boats. At Cairo, Illinois, the railroad journey was begun north to Chicago, thence to the East. A second route from Texas was over a trail to shipping points on the Red River, from which places the cattle were forwarded on steamboats to Cairo, then to be shipped north by rail. A third route followed the trails from Texas to feeding grounds along the railroads in Kansas and in regions farther north. From stations along these railroads the livestock were forwarded to eastern markets.

In order to reach these northern points in Kansas three or four cattle trails were used, which have since become famous in song and story. When the drives were resumed after the Civil War most of the herds followed the old routes of the preceding decade towards southwestern Missouri. The more favored of these, which led north by east through the eastern part of Indian Territory and Baxter Springs in the southeastern corner of Kansas, was known as the "Baxter Springs Trail." Later it became known as the "Old Shawnee Trail."[5]

After a cattle market and shipping facilities had been established at Abilene, Kansas, in 1867, a route through the Indian Territory further to the west came into prominence. This was the Shawnee Trail. Other trails were broken as a result of the railroad construction in eastern and southern Kansas. Only a few had distinctive names. One of these was the Chisholm Trail through the western part of what is now Oklahoma into Kansas, and was named after John Chisholm of Paris, Texas. It was some 6,000 miles long and 200 to 400 yards wide. Most of the Chisholm Trail comprised the Panhandle Trail to

[5] Love, Clara, Southwestern Historical Quarterly (July, 1916), Vol. XX, No. 1.

western Kansas and Colorado, which was much used until a railroad was built northwest from Fort Worth through the Panhandle into Colorado in the late eighties. Still further west was another noted cattle way—the Pecos Trail. Its course was up the Pecos River Valley in New Mexico and on north to Colorado. Two of the trails to Colorado were later called the "Goodnight" and "Dawson" trails, after noted cattlemen.

Golden Age of the Cattle Trail

The decade of 1869–1879 was the golden age of the cattle trail. About 4,000,000 cattle were driven north in those ten years. They came with great regularity during the seventies except in the years 1874 and 1875, when the effect of the financial panic diminished their number.

For several years after the cattle driving began, however, there was a prejudice in the eastern markets against Texas beef. This was partly due to stories of the effect of Texas fever among cattle, and partly to undefined fears that the meat was otherwise unwholesome. In some markets the prejudice was so great that Texas beef was almost unsalable at any price, while that of local origin ranged high. Indeed, many people were afraid to eat Texas beef, and considered its presence on the blocks of their butchers an offense which should be forbidden by law. Of course, this kept down the prices of Texas beef grades taken north.[6]

Texas Longhorn Steers

The Texas steer, indeed, was not a prepossessing animal as compared with eastern farm cattle. The body had an emphasized lankiness and was set on long lanky legs. The

[6] Smiley, Jerome, Prose and Poetry of the Livestock Industry, p. 438. An illustration is this: A shipment of beef cattle made from Kansas to the East in 1867, consisting of a round lot of about 900 head that had been bought there at something like $20 per head, finding no market at Chicago, was forwarded to Albany, New York, where it sold for $300 less than the freight charges alone, leaving the original cost of about $17,500 for the lot a dead loss and requiring the shipper to throw the $300 more into the hole.

head was elongated, and in many of the animals the long narrow face had a sinister and sullen expression. The wide-spreading curved horns, unlike those of almost every long-horned variety of cattle, generally had a horizontal trend, and it was not uncommon for them to have a spread of 5 feet from tip to tip. These cattle had become known by different names in different parts of Texas, such as "Dogies" in the East, "Sea Lions" along the Gulf Coast, and "long-horn" elsewhere. "Texas steer," however, was a name that was familiar everywhere. One merit this stock had was that it was well adapted to the period in which cattle were put on the trail in Texas, and driven day after day to northern markets and northern ranges. When this period came to an end and shipments were made by rail, these cattle were displaced, for the horns were a great inconvenience. An excited steer in a car might cause great damage, and but few could be put in one car. Yet no great change in the general character of the mass of Texas range cattle was apparent until late in the eighties.

The range cattle industry had a period of ups and downs in the early seventies, and it was not until about the time that the meat packing industry began to demand great supplies of cattle to can and to dress for eastern and foreign markets that it became settled and prosperous. These new features and methods in the packing industry, which are to be considered more in detail in a later chapter, brought a revolution in the meat industry of the world.

Rail Rate Wars Aided Cattle Trade

From 1867 to 1873 there had been a demand for Texas cattle which had brought out a large supply. Big profits were made. One reason for this great rush of cattle to the markets in 1870 was the fierce "freight war" that broke out between the trunk line railroads from Chicago to the Atlantic seaboard and that also affected rates from Chicago west. In the competition for business, rates went down until the freight charge

on a carload of cattle to Buffalo, to Albany, or to New York, sank to the nominal price of $1. It was said that when the freight reached that point, some of the roads took entire trains of cattle through to New York free of all freight charges, and some shippers afterwards asserted that in the scramble to keep up a show of business and to demonstrate to rivals they were not weakening, certain roads actually paid a bonus for the privilege of hauling cattle to New York. One of the practical effects of this state of affairs was to transfer the seaboard market prices of cattle to Chicago, and in turn, those that would have been under normal conditions Chicago prices were shifted west into the Missouri River region.

Transferring Texas Cattle to Ranges

This situation in itself had a very remarkable and beneficial effect on future supplies and methods of cattle production. For the Texas cattlemen noted that, due to the large corn crop in the corn-growing states, there was an active demand for cattle for feeding purposes, and, therefore, most of the grades of southern stock which would under former conditions have gone to the northern ranges, were taken by the corn farmers. It was also felt that the demand for Texas stock from the northern ranchmen was nearing its end with the natural increase on the ranges, and for the future the Texas cattlemen would have to drive their surplus immature cattle to ranges in the North, and "fatten" them there on their own accounts. This marked the beginning of the great business of transferring Texas cattle to northern ranges and there rounding them out for market.

The financial panic of 1873 and the depression that followed hit the cattle industry of the West very hard. Enormous losses were sustained, for many cattle had been held for higher prices. Most of the cattlemen were in debt to banks, their cattle being pledged as security, but many banks went to the wall, and those that did not called the loans as they came

due. Cattle were sent east greatly reduced in price. This was the case also with Texas stock. In order to dispose of the cattle, thousands were killed for their hides, horns, hoofs, and tallow. Several rendering establishments were set up in Texas, the most important one being located at Fulton. This continued until values of rough cattle rose to about what the rendering establishments could afford to pay. Since then there has been no slaughtering of range cattle as a business simply for the by-products.

Recovery after Panic of 1873

From this condition of depression the stock raising industry began slowly to recover in 1876, owing to the operation of three factors. These factors were:

1. The gradual recuperation of the South, which gave the planter a surplus which he spent in buying the beef and pork products of the North as before the war.
2. Great development of dairying, cheese, and butter manufacturing, which created a new demand for milch cows.
3. The industrial and commercial recovery of the country, which revived purchasing of meat by the masses.
4. Rise of the range cattle business of the great plains to huge proportions and the growth of stock feeding in Kansas, Nebraska, Iowa, and Illinois, which brought into being stockyards in the West.

Having reached the heyday of the open cattle range, it is well to consider the economic relations of that institution, about which there has been thrown great glamor and which has been the subject of much literary romance. For further discussion of its methods and management the reader must be referred to special works on the subject.[7]

[7] The most convenient source of information regarding the ranges and livestock production on them is in the following: Barnes, Will C., Western Grazing Grounds and Forest Ranges; and Barnes, Will C., and Jardine, J. T., Livestock Production in the Eleven Far Western Range States, Part II of Meat Situation in the United States, p. 1110 (1916). A good deal of the information in this chapter was gained from "old timers" who were very kind in imparting it. For a narrative full of color, see Hough, Emerson, Story of the Cowboy.

History of the Open Range

In brief, the history of the open range business in the West has had three periods. First came the boom days, between 1877 and 1886, and then the time of reaction up to 1890, which was followed by a readjustment of the business on common sense methods. In this chapter we trace conditions to the end of the first period, to show how it made possible the revolution in the meat packing industry in the seventies.

In the early days the pioneer cattleman entered a virgin district and claimed everything within sight. When a second appeared with his stock, the two would divide the district, and each keep on his side of the division line agreed upon. As others came in, the district was further divided, until it was considered by the stockmen to be fully occupied. With this appropriation of the country, and the practice of arbitrarily defining the boundaries of the ranges, there developed the theory of "range rights"—that is, a man's right to his range in consequence of priority of occupation and continuous possession, although none asserted actual ownership of the range land. These stockmen had liberal ideas as to when a district was fully occupied, however, and when range or ranch buildings were nearer than 15 to 30 miles from each other, the country was becoming, to their minds, crowded.

A Typical Range

The ranch headquarters were located as near the center of the range as convenient. The chief consideration was nearness of surface water, and so the buildings were often out in the open. The typical headquarters of a "ranch outfit" was a "double cabin," built of logs, where the men messed and slept. Near this ranch house was a corral and a small pound, or chute, for handling the cattle ready for market. Not much was spent on this side of the range life.

For the cattle were the main interest of the stockmen and cowboys on both the range districts—the southern or breeding

Figure 11. Watering Cattle on a Western Range

range, including Texas, Oklahoma, Arizona, New Mexico, and the southern half of Colorado, and the northern, or finishing range, sometimes called the "steer" range, which included the rest of the Rocky Mountain states. In the early years Shorthorns, then called Durhams, were the predominating breed. The Texas cattle brought north were bred up mainly by the use of Shorthorn bulls. The Devon was also raised to some extent, being taken west by the Mormons. Later, as the Shorthorns failed in stamina to withstand the winter and drought, the Herefords made their appearance, and because of their great rustling ability and their early maturing qualities, they became the breed cattle on the open ranges.

It is not possible to describe at length the life of the stockmen and cowboys, but it is well to try to catch the spirit of their lives.[8] People in eastern cities have had an idea that it was monotonous, but it was nevertheless a life of activity and had exhilaration for a great army of cowboys, some 100,000 strong, in the days when the open range was at its height. The exhilaration was due in part to a "trinity of evils"—contending with blizzard, drought, and the stampede. Many of these experiences became the theme of verse, and recently Professor John A. Lomax has brought some of them together in an anthology entitled "Songs of the Cattle Trail and Cow Camp," celebrating a tradition typically American and preserving for the future these distinctively romantic songs. Here again one may see the cowboy at work and at play: hear the jingle of his big bell spurs, the swish of his rope, the creaking of his saddle gear, the thud of thousands of hoofs on the long trail winding from Texas to Montana.

The Round-up

One operation of the range remains to be considered here. This was the "round-up," a harvesting of cattle, a great

[8] Some of this life is described in Roosevelt's "Ranch Life and the Hunting Trail," and in Emerson Hough's "Story of the Cowboy."

gathering, a sorting out and branding of beasts, young and old, that were without marks of ownership. The round-up and the driving of cattle on the trail were the two great spectacles of the range cattle industry in the seventies and eighties. There were two round-ups each year, apart from the usual work of the stockmen in looking after their cattle. One came in the spring, the other in the fall. They covered areas of 4,000 or 5,000 square miles. It was for the purpose of gathering together all the cattle and their enumeration, identification, and redistribution. State and territorial associations of stockmen divided the entire range country into districts, and the cattlemen of each district adopted a co-operative system to round up their cattle, under the leadership of an elected captain of the round-up. The method was to take the ranges successively and to give each cowboy a certain section to clean up.

> By the time the drive was finished, some 2,000 to 4,000 cattle have been thrown into one herd at the chosen place . . . . a dusty, milling, confused and bawling mass of excited beasts. Rebellious steers are shaking their heads and making threatening demonstrations with their horns; the half grown are trying to hide themselves by pushing their way toward the center of the horde; mother cows are distracted by their separation from their offspring; and bleating calves are trying to make themselves heard by their mothers in the uproar. The cowboys ride 'round and 'round the mass, driving back the more enterprising beasts determined to escape from the situation so disturbing to their peace of mind. But the disorder and confusion were not really as great as they appeared to be. The men were doing their work systematically in keeping the cattle together and in quieting them in preparation for the next stage of the proceedings.[9]

Branding Cattle

Then came the branding. If the calves were to be branded, they were first cut out by the men very quietly. After this the steers, cows, and strays were taken out. The cows and their

[9] Smiley, p. 614.

calves were then driven to some corral, if one were available, or rounded up on the prairie, a fire built and when the irons were hot, the calves were roped and dragged to the fire. There two men grabbed them, one at the neck, the other at the feet, while others ran up with sharp knives to mark the ears and hot irons to burn the brand into the sides of the animals.[10] In earlier years the brands were letters or some symbol, but later they became complex. One of the more striking was made of the initials of a San Antonio stockman—H. E. L. L.

The Great Cattle Companies

The latter part of this first period of the range history is known as the "great cattle boom of the early eighties." This has been well described by John Clay, the noted Chicago stockman, who was active on the ranges at that time.[11] After the industry recovered from the depression in the seventies, it was put on a more highly organized business basis. This was the day of the great cattle companies, many of which were promoted by English and Scotch capital. They were mostly floated in Scotland, and it is remarkable how freely the cautious Scotch investors loaded up with the securities of this character. The reports written on properties were couched in the most sanguine language. The newspapers were enthusiastic and paper profits looked enticing. It was one pyramid upon another. If the cattle had been actually counted and then carefully managed, it would be conservative to say that the average delivery of the various herds turned over would amount to about two-thirds of the book count. Here is a list of a dozen companies. There were others, but the following represent the larger companies:

The Prairie Cattle Company.
The Swan Land and Cattle Company.
The Texas Land and Cattle Company.
The Matador Land and Cattle Company.

[10] For a selection of brands, see Barnes, pp. 186–189.
[11] Clay, John, My Life on the Range (Unpublished).

The Hansford Land and Cattle Company.
The Arkansas Valley Land and Cattle Company.
The American Pastoral.
The Powder River Cattle Company.
The Western Land and Cattle Company.
The Cattle Ranch and Land Company.
The Western Ranches.
The Espuela Land and Cattle Company.

In the year 1883 these cattle companies were flourishing. In 1887 every one passed its dividend, and today, after less than 40 years, only two of them remain—the Swan and the Matador. These companies had in round numbers debentures and reference shares of nearly $10,000,000 and a share capital of $12,500,000. How much has been returned it is impossible to tell. The loss, when interest and compound interest is computed, has been enormous. Only two of them, the Matador and the Western Ranches, have made a respectable showing.

Flotation of Cattle Companies

This great boom was set going by the high prices of cattle. In 1878 and 1879 the prices of ordinary stock cattle for range herds had been from $7 to $8 per head. Values in 1880 were around $9.50. Throughout 1881 the prices rose and reached $12. This great increase was due to several causes. The country generally was prosperous, and market demands for beef were ever widening. The packing industry had by its new methods increased greatly. The movement that began among the stockmen of the southern half of the cattle country in 1880 to increase the size of their herds, had in 1881 extended into the northern range districts and was demanding outside stock to add to the range herds.

This boom attracted many inexperienced people as well as others. Many young men from Britain and the eastern United States were simply in search of adventure and they proved a hindrance to constructive growth. There were, however, men who began at that time, who were in later days of great impor-

tance in the cattle and beef industry. One of these was Conrad Kohrs. Another was Henry Miller of Miller and Lux, a nervous little German, who was a pioneer in the meat packing business on the Pacific Coast. He had many of the characteristics of Nelson Morris, including a gift for selecting men and for organization.

The boom meant an overstocking of the range, which was unwarranted, and when the crisis of 1884 and the ensuing depression came, the mushroom industry went to pieces. Prices sank lower and lower during 1885, and by 1886 the crash ruined many cattlemen who had been rated as millionaires.

Relation of Range to Meat Packing

Several aspects of this period of the cattle industry have had great influence on meat packing. The first had to do with the diseases of cattle. There had been outbreaks of disease among the western livestock in the seventies and early eighties, which had been the subject of government investigation. Indeed, as far back as 1868 the federal government had considered the chance of the spread of Texas fever and had established quarantine stations in western Kansas.[12] At that time it was felt that there was danger in having an unregulated trail from Texas, as the Texas fever seemed to spread from there. There were also foot and mouth diseases and pleuropneumonia, which had become a serious menace. Dr. Hopkins, the state veterinarian of Colorado, spread his idea against disease and the unprotected condition of the open range.

Several states, such as Kansas and Colorado, passed quarantine legislation against Texas cattle. Leaders in the western cattle business saw something had to be done, and Governor Routt of Colorado, Conrad Kohrs, and Granville Stuart of Montana, and in the East, DeWitt Smith of Bates, Illinois, and Alvin H. Sanders, editor of the *Breeders' Gazette,* worked out

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[12] U. S. Agric. R, 1868 5; 1870, 40–42; 1871, 32–33; 1872, 33–34; 1878, 24–26; 1882, re Texas or Spanish fever.

a plan which resulted in the organization of the National Cattle Growers' Association of America. A convention was called which met in St. Louis in 1884.

A suggestion had been made that there be set aside land for a National Cattle Trail from Texas to the ranges.[13] Land for such a trail was to be withheld from private entry. It was to be 690 miles long, with an average width of three miles. Its area was to be 2,070 square miles, or 1,324,800 acres. The Texas cowman urged it, for he saw it as the only outlet for his products—the northern pastures. He was being crowded by the steady increase in his herds and his market lay out of the state. However, the agitation in the convention and through the country at large for the trail came to nothing. The really valid objection to it was in the changed and changing condition of stock raising, and against this there was no use in fighting.[14]

Origin of the Bureau of Animal Industry

One other important work which this convention at St. Louis accomplished should be noted. It empowered its executive committee to urge upon Congress the creation of the Bureau of Animal Industry, and this was soon established. Since then the importance of this bureau in the development of the meat industry in the United States has been fundamental.

The final aspect of the range cattle industry to be considered in this chapter is its financing. The expansion of the boom in the eighties was financed principally by actual money put into shares of the cattle companies. When this source was exhausted the progressive cattle owner had to get temporary loans in other parts of the country, and especially in Chicago.

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[13] See Nimmo Report (1885) for details.

[14] Nimmo Report (1885) p. 35.

H. Exec. Doc., 2 Sess., 48 Cong., Vol. 29, serial No. 2309 gives this explanation: "A fact that a very large number of the present occupants of the ranges, a majority is openly and earnestly opposed to the driving of Texas cattle to the northern ranges upon purely commercial and economical considerations. (1) They do not wish to be confronted by the competition of the Texas cattle in their midst. (2) They find that the Texas cattle in many places eat out the grass upon ranges which for years past they have regarded as by prescriptive right their own. (3) The contact of their herds with the Texas herds tends to depreciate the breed of their cattle owing to the fact that the Texas herds usually contain a certain proportion of Texas bulls and cows and bulls intermingle on the range."

Lyman J. Gage, president of the First National Bank of Chicago, made many loans to big cattle owners in the West. The cattlemen deposited in the fall and winter and borrowed in the summer. This grew to be a big business. By 1894 the cattlemen were selling paper to the trust companies, and it classed with commercial paper. Advances against stock cattle were not made. Loans were against steers on the range that had been wintered, or in cattle and sheep in the feed lot. It was in the eighties that the business of cattle loans, as at present carried on, really got a start.

The Passing of the Range

In the years from 1886 to 1890 it was becoming plain that the old range industry was being revolutionized. The Kansas granger was pushing westward, building fences and standing on his rights as a homesteader, and railroads were threading their way over the country. The granger opposed the Texas herds crossing his lands, and fierce feuds developed between the cowboys and the settlers.

The federal quarantine, the barbed wire fence, and the homesteader seeking to farm and raise a few corn-fed as well as grass-fed cattle, where the cattlemen had grazed thousands, were the three factors which destroyed the old range industry. According to Thompson, "The day of the ranch farm was past the dawn." As Roosevelt wrote in his "Autobiography," "the great unfenced ranches, in the days of free grass, necessarily represented a temporary stage in our history."

CHAPTER IX

EXTENSION OF LIVESTOCK MARKETS—1865–1885

Eastern Meat Demand

After the Civil War, with the supply of livestock for the increasing industrial population of the East being raised on the great ranges of the West, it was necessary to develop means for its transportation across the continent. Eastern cities like Philadelphia, New York, and Boston depended for meat on the farms west of the mountains, and the fact that their situation was becoming serious is indicated by a special article entitled "Meat Supplies of Great Cities," in the United States.[1]

This necessity for finding means of getting meat to the East was met by the construction of railroads and the extension of livestock markets. Indeed, without the railroads, the future development of the livestock industry was impossible, and the influence of railroads has been fundamental in the growth of the Middle West. "The great grain fields of Western Ohio, Indiana, Illinois, and Iowa, have been mainly cultivated because the railroads made the products marketable and profitable" is the statement of the Census Report for 1860 on the effect of railroads on agriculture. The effect of improved means of transportation on the value of produce in the interior is shown by the trend of prices at Cincinnati from 1826 to 1860. From 1835 to 1860, under the influence of railroad competition with canals, the price of corn advanced 50 per cent and that of hogs 100 per cent. Another way in which the influence of railroads was favorable to agriculture was in

[1] Agricultural Report for 1870-1871.

increasing the values of land, e.g., in Illinois from $1.25 to $11 an acre.

It is significant that during the same period that the range cattle industry was developing in the West the railroads to that section of the country were being built, and by 1875 were ready for the commercial application of the idea of the dressed beef traffic, which was to revolutionize the meat industry and its distribution methods.

In 1860 there were 30,000 miles of railroad in the United States, which included construction in every state east of the Mississippi River. In 1865, this had increased to 35,085 miles. During the following 23 years, up to 1888, there were three great waves of railroad construction, checked only by financial depressions. As a result, in 1888, there were 121,000 miles of new railroads. A remarkable fact of the first 8 years of the period, 1865–1873, when the new cattle supply of Texas was coming north to the range country, is that the railroad mileage increased 100 per cent, the first Pacific railway was completed, and construction was begun on a second one. Most of this expansion was in the West.

Railroads and Livestock

One must not jump to the conclusion, however, that all development was due to foresight and because of possibilities that were realized to exist in transporting livestock. On the contrary, one cause of the excessive mileage being built was to save from lapsing the great grants of land made by Congress. Following the depression of 1873 there was little done until 1879, when railroad construction revived and three additional transcontinental railroads were finished—the Northern Pacific, the Atlantic and Pacific, and the Southern Pacific. In the same interval the Union Pacific, by the construction of its Oregon Short Line northwest to a connection with a branch of the Oregon Railway and Navigation Company's system, the Atchison, Topeka and Santa Fé, by construction of its line to a con-

nection with the Southern Pacific, and the Chicago, Burlington and Quincy, by the construction of its Denver extension, added three other important routes to the Pacific Coast.

In the earlier part of this period, from 1865 to 1885, the railroad's function was simply to provide means of transport for the ever-increasing numbers of livestock, at first from Texas to the ranges, and later from Texas to Chicago and the East; but as the railroad map extended into the heart of the range country, it proved in the latter half of the period to be the most important influence in changing the cow country and in bringing the boom days to an end through carrying the settler west.

At the end of the Civil War there were several great trunk lines radiating from Chicago, making Illinois, Iowa, Minnesota, Nebraska, and Dakotas, and all west of the Rockies tributary to it. Indeed, St. Louis complained that no trunk lines yet led through that city, although as early as 1857 the Ohio and Mississippi Railroad was extended from Cincinnati to St. Louis, where it connected with the Missouri Pacific, which was then under construction from St. Louis to Kansas City.

Railroads Needed Traffic

These lines to the Mississippi River were looking to Texas for traffic. One of the pioneer cattlemen, Joseph G. McCoy, in his book, "Sketches of the Cattle Trade" (1874), writes of the principal western railroad lines engaged in this livestock traffic. Of these, the Hannibal and St. Joseph, terminating at Quincy, Illinois, where both Chicago and direct Buffalo connections were made, was the first to appreciate and encourage the western cattle trade.

Shortly after this, the St. Louis, Kansas City and Northern Railroad, which formed with the Chicago and Alton a short direct route to the grazing and feed regions of central Illinois as well as the Chicago market, followed in developing the cattle traffic. West of the Missouri River the Kansas Pacific, now

the Kansas branch of the Union Pacific and the Kansas and Fort Scott, later the Kansas City, Fort Scott and Memphis, entered the field of livestock production by branch or feeder lines and gathered the livestock from the ranges and concentrated it at Kansas City.[2] The Missouri Pacific and Kansas City, Lawrence and Southern, which ran through a rich grass country, also did a good cattle business from the start. These railroads opened the way for the Atchison, Topeka and Santa Fé, which by the nineties had grown to be the greatest cattle road centering in Kansas City, for it penetrated most of the southwestern range country and had branches reaching out and drawing shipments from all sources.

Turning Point for Livestock

The advent of the railroads was a turning point in the development of the livestock industry, but the railroads themselves were not the first to see the possibilities in the transportation of cattle. Instead, it was the Texas drovers who believed that railroad transportation at reasonable rates to Kansas City or Chicago, or some other large center, would be the solution of the problem. This revolutionized the methods of transporting beef to the East. In this progressive step Joseph G. McCoy was the pioneer in adapting the Kansas railroads to the Texas cattle industry. As a result of his efforts the successive points at which the cattle trail crossed the transcontinental railroads became one after the other great cattle markets and shipping points.[3] These were the famous or notorious cowtowns.

The first of these markets and shipping points was Abilene, Kansas, on the Kansas Pacific Railroad. McCoy selected the spot and with difficulty persuaded the railroad to make rates and give facilities. He chose Abilene because the country was entirely unsettled, well-watered, had good grass, nearly all the area was adapted to holding cattle, and it was the farthest point

[2] Powell, Cuthbert, Twenty Years of Kansas City Livestock Trade and Traders, pp. 78–79.
[3] McCoy, Joseph G., Sketches of the Cattle Trade, p. 50.

east at which a good depot for the cattle business could be made. The news spread that a market and an outlet for cattle had been established at that point. This was in 1867. The first year some 35,000 cattle were driven north to Abilene and shipped east from there by rail. On September 5, 1867, the first shipment of twenty cars left for Chicago. The second shipment went to Albany, New York.

New Methods Started

Abilene thus proved to be the turning point from the old to the new methods of bringing livestock from the West to the East. Texas cattle became popular for packing purposes and the demand increased. It was stated that a fat Texas steer was better for packing purposes than a native, that its meat was better "marbled," i.e., the fat was distributed in alternate layers with the lean fiber, and the meat when cut presented the appearance of variegated marble.

Other cowtowns, which had their day as the railroads pushed their way ever westward, were Newton, where the cattle trail crossed the Atchison, Topeka and Santa Fé, and Baxter Springs, on the Fort Scott and Gulf Railroad. With the advance of the settler the cattle trail shifted to the west. After 1876 the chief shipping point on the Kansas Pacific was Ellsworth, 40 miles west of Abilene. At a later date Hayes City took its place. On the Santa Fé, Dodge City became more important than Newton. It was regarding this Dodge City that the saying arose describing those cowtowns that there was "no Sunday west of Dodge City, and no God west of Pueblo."

In 1865 Atchison in northern Kansas had been the chief point of departure west. Omaha had not yet become important, for at that time it had not been reached by the railroad. Leavenworth and Kansas City were becoming markets of significance, with the latter having the better prospects. Its future, however, was not to be that of a mere transfer shipping point, but as a great centralized livestock market. The

same is true of Omaha which continued to increase in importance as a livestock center after it became the starting point of the Union Pacific. With Council Bluffs, it grew to be the western focus of the rapidly building railroads which were being constructed all over these three states, Illinois, Iowa, and Missouri, and on which the prosperity of the corn belt as a livestock feeding and fattening ground was largely based.

Transporting Livestock

The second point of consideration in tracing the development of livestock distribution in the early years of the modern period of the meat packing industry is the actual transportation of livestock.[4]

There is no doubt that ignorance and unnecessary cruelty account for the situation in livestock transportation in the period under review. In their report for 1870 the Massachusetts Railroad Commissioners state that "shrinkage between Chicago and Boston is 10 to 15 per cent," and add:

> Cattle trains yield the road to most others and pass hours on the sidings; the animals are without food or water and often with insufficient ventilation in summer or shelter in winter; they are jolted off their legs and then goaded till they struggle up, for they can not be permitted to lie down. They thus arrive at their destination trampled upon, torn by each other's horns, bruised, bleeding, having in fact suffered all that animals can and live. Under the most favorable circumstances they leave the train panting, fevered and unfit to kill; under the least favorable, a regular percentage of dead animals is hauled out of the car.[5]

This treatment made the meat almost unfit for food.

Until the seventies railroads were poor, their construction was hazardous and costly, equipment meager and primitive, and the service as a consequence, inadequate. This pioneer

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[4] See Report of Commissioner of Agriculture, 1872; and George F. Angell, President Massachusetts Society of Prevention of Cruelty to Animals, pamphlet, "Cattle Transportation in the United States."

[5] Report of Massachusetts Railroad Commissioners (Jan., 1871), p. 31.

transportation for livestock has been described recently in the *Breeders' Gazette*. The writer, James E. Downing, says:[6]

> Accommodations for human beings as well as livestock were crude and uncomfortable. Freight rates were high, often more than double rates today, and they were based on carload lots instead of cents per pound.
>
> The cars were equipped with hand brakes and old rubber springs that soon became hard. Trains were coupled with long links and pins and the great amount of slack in a freight train caused a tremendous impact at every movement during the journey. On Western roads, old, wood-burning engines, equipped with link and pin couplings and hand brakes, slowly dragged the trains, usually starting them with a jerk and stopping them by reversed gear, causing everything not nailed down to go into a heap at the far end of the car.
>
> The average schedule time for trains, including stops, on the five leading roads in the West in 1873, was 10 miles an hour, while the highest speed allowed was 12 to 15 miles per hour. These trains ran on short, light, iron rails, joined with the old "iron chairs" spiked into wooden ties. The roadbeds were rough and poorly ballasted; with excessive grades, wooden bridges and trestle work, and everything was in a poor state of repair.

III Treatment of Livestock

The high arbitrary carload rates then charged for the transportation of stock induced overloading as a measure of economy. The result was that the weaker animals were knocked down by the bumping and rolling of the train, and trampled upon by the others until helpless or dead; or, if they were able to rise, were frequently so injured that they afterwards died. In hot weather their suffering was intense. All this added to the death toll and loss to the shipper.

It was the invariable custom for shippers and attendants in charge of cattle shipments to carry lanterns and an instrument known as a "prod pole." It consisted of a heavy handle, nearly six feet long, with a sharp iron or steel spike extending from one end a half-inch or more. This was used to prod the other animals in the car aside, while a "down steer" could be encouraged by the sharp point to take his place in the ranks. The prod

[6] *The Breeders' Gazette* (Aug. 25, 1921), Vol. LXXX, No. 8.

pole was also equipped with a flat-headed screw, driven into it near the "business" end, and extending out a short distance at right angles from the pole. When the "down steer" refused to respond to numerous jabs and such language as was employed on those occasions, the end of the pole with the attached screw was engaged with the matted end of his tail, and by sundry twists, turns or pulls on the pole a severe strain was applied to that sensitive appendage. If the prostrate steer had life or strength enough left in him to rise, this treatment would bring about the desired results; if he continued in an indifferent attitude, he was considered in a bad way, and a dead steer when the market was reached.

In the early days unloading gangs at the markets carried ropes for the purpose of dragging out dead and crippled cattle from the cars. The principal buyers at the stockyards had men stationed at the scales regularly to watch for broken-ribbed cattle, which were frequently found. Five dollars per head was deducted from the purchase price of every unsound steer, buyers sometimes refusing to take them at any price. Overloading was intensified by the high prices paid for animals kiled en route, which sometimes brought almost as much as the live ones. In 1869 Berkshire hogs taken dead from cars sold regularly at $4.50 to $5.00 per cwt. Railroad pens at places where the stock was loaded or unloaded were as a rule not sheltered, and much of the time knee-deep in mud and filth, making it impossible for animals to lie down to rest.

First Stock Cars

Even these primitive methods put stock on the market in less time, much better physical condition and reduced the loss of weight. The railroads began to cater to this new source of revenue, and the first permanent stock cars were built. The old cars in which fuel for the engine was hauled were used as models. The old cars had an unoccupied space of two feet at the end of the platform or floor, in which stockmen used to ride, and frequently sleep. The cars having been built without roofs or hayracks, the fodder or hay was thrown among the animals, and branches of trees were placed over the crossbars to afford shade and shelter from storms. The permanent roof originated not so much as a shelter as to prevent the escape of small animals. There was great difficulty in hauling mixed shipments. At first hogs were loaded on the floor of the car,

and sheep on a temporary deck above. The frequency with which shippers experienced losses from sheep jumping over the top of the car caused the method of loading to be changed, and the reverse was tried; that is, the hogs were loaded on the temporary deck above. But this was found impracticable, because the sheep became foul from the droppings of the hogs. The difficulty was finally overcome by loading the sheep on the upper deck and constructing a permanent roof to prevent their jumping overboard. This was the origin of the present double-deck stock car.

On the first cars brakes were applied to the front trucks only; they were operated by a shaft having a cross ram with two upright handles, the shaft extending through the platform at the end of the car.

Livestock Transportation Laws

Such was the status of the transportation of livestock previous to the adoption of the Federal and State laws which required that livestock en route to market should be unloaded and given five hours of rest with feed and water after having been on the cars continuously for 28 hours. The law was first enacted by the legislature of Illinois in 1869, and was framed to meet the transportation conditions of that time, which were even more primitive and barbarous than those of 1873, when it was adopted as a Federal Law. A violation of the Illinois law subjected the offender to a fine of not less than $3.00, nor more than $200. The Federal law has been amended as changing conditions have made it necessary. Experience showed that it was dangerous to attempt to unload sheep from cars after dark, so an exception was made by which they might be kept on cars for 36 hours, if the period of 28 hours ended after nightfall; but 36 hours is the limit of time that they may be kept aboard without unloading.

But this care for livestock came only by slow degrees and is not perfect even yet. With the establishment of the earliest cowtowns, and the first experiment from Abilene by the Hannibal and St. Joseph, all the railroads were anxious to carry as many cattle as possible, but it was only in time that competition forced them to provide stockyards and better care on the journey through facilities for feeding and watering the stock. The

Northern Pacific in 1885 met this need by disembarking the cattle at stations where good pasture was to be had and allowing them to graze for several hours each day. The owner of the livestock was given a free passage on a passenger train and also a number of cowboys, who traveled in a special car attached to the cattle train.[7] A little later other railroads saw that something more must be done, and so they began to improve their cars.

Different Types of Cars

Of the several kinds of stock cars in general use by 1888, the Burton car was the best, but it had the disadvantage of being permanently divided into compartments, which interfered with return freight.[8] To remedy defects of the Burton car an adaptation to meet the conditions was made. The new car was called the Newell car. It carried troughs and feed racks which could be folded out of the way to permit the carrying of freight. Later on a stock car was developed which was modeled on the Pullman passenger car. It had 52-inch steel-tired papier-maché wheels, elliptic springs, Westinghouse air brakes, and automatic couplers to prevent jars. Cattle were driven into these cars and boxed off in separate compartments by transverse slats lowered from the roof. There was enough room in each stall for the animal to lie down at will. The animals were fed by having food dropped from a bin in the roof into mangers in the side of the car. From a tank in the rear water was supplied to troughs at the side of the car by pipes which ran around the car on the outside. Fan wheels on each end and a double roof kept the car well ventilated in the warmest weather.[9]

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[7] Bancroft, H. H., History of Washington, Idaho, and Montana, pp. 736–737.

[8] The advantage of the improved car was set out in the report of Erskine R. Merrill, general agent of the Burton Stock Car Company. He pointed out that cattle weighing 935 pounds in Winslow, Arizona, lost only 53 pounds on the trip to Kansas City, some 1,204 miles, in 72 hours, the cattle being watered and fed twice daily. On the other hand, a trip of 1,196 miles in ordinary cars which took 5 days, the cattle being unloaded at feeding time, resulted in an average loss of 185 pounds per head.

[9] H. Misc. Doc., 50 Cong., 2 Sess., No. 139; also Love, Clara, Southwest Historical Quarterly, Vol. XX.

Among the stock cars which are still common was the Mather car. The originator of it was A. C. Mather, who became interested in 1881 in improving the conditions of transportation of livestock. He designed an improved car, but was unable to get the railroads to build his type of car and had to do so himself, organizing a company for the purpose—the Mather Stock Car Company. A committee of the United States Senate investigating the transportation and sale of meat products in 1889 was told that the shrinkage in weight of stock was 65 per cent less in these palace stock cars than in ordinary cars, in which the shrinkage was often 8 to 10 per cent of the total weight of the animals.

By 1889 there were seven companies operating stock cars and these have in the main continued in the business. The railroads, however, have added stock cars to their equipment and now own more than do private companies.

Railroads Not Altruistic

While the railroads did revolutionize the methods of marketing the livestock supply of the United States in the seventies, it must be noted that they were not guided by altruism. True, often the rates from the West to the great cattle markets were reasonable, and had an important part in building up the present system of centralized markets. But at the same time the railroads were in the heyday of that period of their history when their attitude towards the public was that of the remark attributed to Vanderbilt, although always denied by him, "the public be damned." Therefore, the rates from the fast-growing important livestock markets of the Middle West in the Corn Belt—St. Louis, Kansas City, and Chicago—were more and more regulated in their interest. The first period of railroad combination to charge exorbitant rates lasted from 1873 to 1878. That it stirred up public opinion is shown in a pamphlet written in 1878, entitled "The Railroads! The Stock Yards, The Eveners, an Exposé of the Railroad

Ring."[10] As a result of this outburst of public feeling the railroads thought it wise to change the form of pool from a traffic pool to a money one.

Protection from exhorbitant charges was asked on two grounds: (1) that livestock were so ill treated in transit that they arrived in unhealthy condition; and more important (2) that a combination of railroad interests and the interests of the stockyards men at the great shipping points discriminated against the producers of livestock by charging twice as much for transportation as was charged for carrying other staple articles to the East.

As to the first charge, there was a statute passed shortly afterward which required all the railroads carrying livestock to unload them in prepared yards, where they were to be supplied with food and water and given five consecutive hours' rest each day. Unfortunately, for a long time the law was so defective that it was often disregarded.

Roads Dominate Long Haul

The exorbitant double charge, it was proved, was due to combination.[11] To quote the argument of the attorney before the House Committee on Agriculture in 1878:

> It is plain to anyone that the lighter and less important supplies come to the markets of our cities by all the roads, rivers, canals and railroads that approach a great city; but that these means of transportation drop off one by one as the distance increases and the bulk of the article increases until when we reach the food of the million, our Eastern cities must depend absolutely upon the four trunk railroads that pass the mountains and penetrate the deep meat producing region in the Mississippi Valley. It is therefore not only possible for these roads to exercise a very great influence on this trade as on all others going east and west, but a greater power because, while there are many ways for the great majority of articles, there are only

[10] This was a reprint of the argument of J. F. Rusling on behalf of the producers and consumers of livestock before the Committee on Agriculture, U. S. House of Representatives, March 18, 1878.

[11] See Vest Report (1890), pp. 2, 16.

four ways open to the meat trade that must come from the far west.

The railroads when united have no competition, practically, for they alone reach out and take the cattle off the cheap pasture lands and set them down in the eastern markets. In order to destroy competition and keep up high rates, it was only necessary for these roads or a majority of them to agree on a rate and agree to supply stock cars only at the yards of certain large stock dealers at the great shipping points in the west. Accordingly, the railroad officials and owners of stockyards from which the farmer and drover of the west can alone ship cattle east, have organized an association and placed the power to control this trade in the hands of select men called "Eveners." We have then the railroads, the stockyards and the eveners, who are parties to an agreement which robs the producer and the consumer of meat by maintaining the cost of its transportation at twice the cost of any other article. It is done in this way: the railroads agree; (1) to charge $115 per car on all livestock shipped from Chicago or St. Louis to New York and this is paid, of course, by the owner of the stock; (2) the railroads agree to pay to the "eveners" $15 for each car of stock shipped from *any point* west of New York, and this without regard to whether the stock is shipped from the yards of the men belonging to the Association or not; (3) the net sum received by the railroads belonging to the association (i.e., $100 per car) is pooled, and the sum total is divided between the roads, without any reference to the number of cars actually transported by each.

This arrangement exists between the Pennsylvania, New York Central and Erie Railroads, i.e., all the great lines except the Baltimore and Ohio, that can carry a freighted car from the Mississippi to the sea. . . .

Eveners Aid Railroads

The link that binds these great roads together and makes it possible for them to control the cattle trade despite all that producers and small dealers can do, is the association of Eveners, to whom the roads pay $15 per car on all cattle shipped from any point to New York. Without them the roads could not possibly keep up the high rates for cattle transportation.

While this Evener combination ended in 1879, there were other and even more powerful associations between railroads

such as the Central Traffic Association, including nearly all the railroads west of Pittsburgh, and from Chicago to the Ohio and Mississippi rivers, and the Trunk Line Association at New York, which included all lines running east from Chicago. These were really one combination, for the Trunk Line Association, by means of the connecting lines, controlled by the great eastern roads, the Pennsylvania, New York Central, Erie, and Baltimore and Ohio, all of which belong to the Trunk Line Association, dominated the Central Traffic Association. This was the situation as late as 1890.

The result of this long-continued policy on the part of the railroads was to give greater and greater prominence to Chicago. The marketing of all western cattle tended to center in that city. St. Louis and Kansas City became relatively less significant as cattle markets, and as a necessary consequence of this concentration also of the cattle trade at Chicago, there were established stockyards at places such as Buffalo and Albany to take care of the eastward flow.

Growth of Markets

The question of the relative situation of the livestock markets of the country at that time is an important one. As has been noted, the cattle markets of the United States migrated from east to west, following closely on the settling of the country. It was believed at one time that Albany in New York State was to be the final gateway for western cattle. Then Buffalo, Pittsburgh, and Cincinnati were in turn regarded as the future great markets of the United States, but as has been seen, Chicago by virtue of location and railroad facilities became by 1870 the largest cattle market in the country.

By the period we are dealing with, the three factors of the large modern livestock markets had been established at Cincinnati and Chicago. With the organization understood, it was natural to set up similar centralized markets further west. The first of these was at Kansas City, where in 1871 the Kansas

City Stockyards were opened for business. The next year the St. Louis National Stockyards began operations, and in the next decade, in 1884, the Union Stockyards Company of Omaha was organized, followed in 1886 by the Denver Union Stockyards Company, and the St. Paul Stockyards Company.

The creation of the Kansas City livestock market was due to necessity. With the growth of the livestock industry came a demand for a home market for the farmers' and ranchmen's maturing stock. The cattle raiser, failing to sell on the prairies, wished to sell at the first point possible. Buyers from the East preferred to buy at Kansas City rather than go to the prairies. Packinghouses were being built at Kansas City. The only drawback was the fact that prices were at times lower than further east. Yet when freights and charges were deducted this disadvantage was not an important one, in fact. On the other hand, as the region directly tributary to the Missouri River for 100 miles on each side developed, it proved to be good corn-growing land, like Illinois. So the feeding states for cattle and hogs were extended. There was an absolute necessity for another livestock center in the Missouri Valley and Kansas City was the best point.

Kansas City Stockyards

This was decided by a few enterprising railroad officials and stock traders who, in 1870, built the first stockyards west of the Missouri River at Kansas City. It was a crude and small place. Yet there were pens and scales and a place for trading and a home market for the constantly increasing number of meat producing animals in the West. Weights had no longer to be guessed at and bank facilities were at hand. These made it possible to carry on larger and more profitable trades within much less time and with less expense than in the old way, where the trader had to drive to the country, carrying currency with him, and rely on his eye in judging the weight of an animal. Such a market brought competition into play.

The moving spirit was Colonel L. V. Morse, at that time superintendent of the Hannibal and St. Joseph Railroad, that was doing the bulk of the stock business out of Kansas City. An area of 5 acres was fenced, divided into 11 pens with 15 unloading chutes and a small pair of Fairbanks scales were put in. Thus was organized the first livestock trade west of the Missouri River, and the nucleus of the Kansas City Stockyards.

In March, 1871, a joint-stock company was formed to erect and operate a complete stockyards. These yards covered 26 acres with all the apparatus of today—pens, lanes, scales, barns, and a business office building. Every railroad entering the city soon connected with the yards, and business was brisk.[12] By 1876 the area of the yards had increased to 100 acres.

Livestock Exchanges

At Kansas City there shortly emerged, as at Cincinnati and Chicago, another institution, the livestock exchange, which has played a great part in our central markets. This institution originated in the livestock markets of the United States because of a need for some way to check dishonest and irresponsible buyers and sellers, unjust discrimination in railroad rates and commissions for selling livestock, the slaughter and sale of diseased animals for food, injurious legislation, and other wrongs and abuses that could not be suppressed in any other way than by concerted action of all those associated with the conduct of the market.

Out of the first small exchange have grown the others, now powerful organizations, looking in efficient manner after the matters just listed. The livestock exchange was for a time an association composed of livestock dealers in a central market, banded together in a voluntary association for providing a

[12] The original officers of this stockyards company were J. M. Walker, Chicago; George H. Nettleton, General Manager; Jerome S. Smith, Superintendent; and George N. Altman, Secretary.

"gathering place" where members could meet and exchange views affecting the market, these members including livestock producers, shippers, packers, commission men, and bankers. It also had facilities for making more efficient and speedy the transactions of the market.[13]

The Kansas City market showed marvelous growth. In 1869 it received only 4,450, but in 1884, some 533,526; in 1871 hog receipts were 41,036, while in 1883 they were 1,379,005. Sheep receipts in 1871 were 4,521; in 1883, 119,180.[14] The scope and source of the supply of livestock is shown in the figures of livestock for 1883 brought by the various railroads to this market.

St. Louis and Cincinnati Markets

Coming further east to St. Louis one must note that it is quite likely that the cattle market there had its beginning at least as early as that of Chicago. It also showed great growth during the period from 1865 to 1884, but its significance is not as considerable, since it was looked on by many as a mere transfer station on the way to Chicago.

Cincinnati, which had been outstripped by other cities as a meat packing and livestock center, showed a great increase in its livestock trade after the opening of the United Railroads Stockyards in 1874. Those yards attracted trade from a wider region and in larger volume. Increased rail communication with Texas resulted in bringing a better class of animals from that state. Of the eastern markets Buffalo was the most important.

Chicago

There remains for consideration Chicago. At this point it seems well to give some idea of the growth and volume of the

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[13] *The National Provisioner* (Feb. 3, 1900), Vol. XXII, No. 5, article on livestock exchanges, by W. H. Thompson, President, National Live Stock Exchange.

[14] U. S. Department of Agriculture, 1st Annual Report, Bureau of Animal Industry (1884), p. 248.

trade, leaving for a later chapter a discussion of the actual workings of the market.

The different kinds of cattle which came to Chicago in 1884, were made up as follows:[15]

Receipts	Cattle	Shipments	Slaughtered
Natives	1,000,000	720,000	280,000
Range cattle	400,000	71,000	329,000
Texas cattle	416,000	none	416,000

In this period the Chicago, Burlington and Quincy Railroad transported about one-third of the cattle to Chicago. It ran through a corn belt unsurpassed in the United States. The Chicago and Northwestern Railroad continued to maintain second rank as a feeder to the great cattle market.

These central liyestock markets developed naturally and inevitably in one great section of the country—the Middle West. Here were the seven "corn-surplus states"—Ohio, Indiana, Illinois, Iowa, Missouri, Kansas, and Nebraska, known as the "Corn Belt." During this period, 1865–1885, they became the great corn-producing area and constituted the natural center of beef production. About one-third of the cattle of the country, other than milch cows, are contained in the states mentioned, and their value is equal to about two-fifths of the total value of such cattle in the United States. Further, large numbers of cattle are shipped into these states to be fattened and forwarded to market.

Corn Belt and Livestock

Corn-fed cattle are the distinctive feature of the cattle industry of the United States. It is important, therefore, to consider the trend of general conditions surrounding the industry in that section and the economic factors affecting it in this constructive period which prepared the way for our present livestock marketing system.[16]

[15] Nimmo Report, Appendix No. 2, p. 87.

[16] This survey of the trend of conditions in the Corn Belt is based on circular No. 175 of University of Illinois Agricultural Experiment Station, "Cattle Feeding Conditions in the Corn Belt," by Herbert W. Mumford and Louis D. Hall (1914).

During the period of settlement, and the earlier years of cultivation of corn belt lands—a period extending from the fifties to the nineties inclusive of the last century—these lands generally were stocked with cows of beef type; and while the country was being brought into cultivation they became a combined breeding, grazing, and fattening ground for cattle. Such localities were admirably suited to beef production because of the abundance of cheap grass and corn they afforded. As the remarkable corn-growing possibilities of the soil and climate in the Corn Belt became more and more evident and the demand for corn grew greater, the westward movement of agriculture naturally stimulated the growing of corn, and to a corresponding degree, diminished the area of grazing land.

At the same time that conditions within the Corn Belt were tending to reduce the rearing of beef cattle there, the industry was extending on the great breeding grounds of the West. Thus an increasing supply of cheap stockers and feeders from the range was a further large factor in causing the abandonment of cattle raising by many farmers, who reasoned logically that calves could be produced and grown more economically on the cheap grass lands of the West than on corn belt farms. Moreover, the attractive opportunities which the range country offered the cattlemen induced many livestock farmers of the Mississippi Valley to migrate west, thus diminishing still further the proportion of cattle feeders to grain growers in the central states. It was estimated that only about 15 per cent of the native steers marketed in Chicago from Illinois were carried from birth to maturity without changing hands.[17]

Beef Fattening

In spite of the rapid extension of the acreage devoted to corn growing, and the great demand that had arisen for corn

[17] Henry, W. A., Feeds and Feedings (1st ed., pp. 46, 389). The statement of John D. Gillette, Elkhart, Macon County, Illinois, is interesting for he became between 1864 and 1878 one of the greatest beef producers in the country.

for other than feeding purposes, the crop was still fed chiefly to farm animals. As nearly as can be estimated, 85 per cent of the corn produced in the United States is fed to livestock. It is, of course, more largely sold off the farms of the corn belt states than those of other sections of the country, but probably not far from one-half of the crop of Illinois is fed on the farm. For beef production in the Corn Belt has become largely a steer-fattening enterprise apart from breeding in Illinois and Indiana. In Illinois more than one-half of the cattlemen are feeders who purchase the cattle they finish for market. More than one-third are both feeders and breeders, but even the latter purchase most of their feeding cattle. About 85 per cent of the native beef steers marketed in Chicago are fattened after having been purchased as stockers and feeders. The extent and tendency of this phase of the industry is also shown in a measure by the shipments of stockers and feeders from large cattle markets during recent decades.

Big and Small Feeders

In the evolution, or transition, of corn belt beef production from a cattle raising to a steer-feeding proposition with a large proportion of the feeders purchased at the big markets, the business, to a considerable extent, had gravitated into the hands of men who handled comparatively large numbers of cattle—from a few carloads to several hundred head. Though these professional cattle feeders in most cases were farmers, they usually bought all their feeding cattle and a large part of the corn they fed, used but little of the manure produced, and freely admitted the large element of speculation incurred. The capital, risk, business skill, and distance from markets involved in cattle feeding necessarily deterred many farmers from converting their corn into beef. The proper place and purpose of beef production in the Corn Belt, however, was to provide a profitable market for the crops grown on the farm, and at the same time to conserve the fertility of the soil.

These considerations were of greater consequence to the small farmer than to the "big feeder." The latter made use of his advantages. It is therefore essential to the welfare of agriculture that the business should be distributed more generally among farms of average size instead of being concentrated in the hands of a few farmers and capitalists whose farms, as well as their fortunes, were frequently enriched at the expense of the neighbors whose corn they bought. With a reasonable degree of skill in buying, feeding, and marketing, it was ordinarily safe and usually profitable for the general farmer to engage in the fattening of steers.

CHAPTER X

DEVELOPMENT OF REFRIGERATION

Refrigeration Basis of Modern Meat Packing

As a basis for the development of meat packing in the modern period there has been traced the history of the western range, which brought into being an adequate supply of livestock. Means of transporting and marketing this supply of livestock which developed in the period 1865–1885 have also been discussed. It remains to consider the growth of invention in refrigeration, because it was this factor which made it possible to utilize to their greatest extent the supply of livestock and the methods of transportation and marketing. Refrigeration enabled the meat packing business to operate in summer as well as in winter, and made the distribution system for meats nation wide and world wide. It is not too much to say that refrigeration made possible the present modern meat packing industry.

In 1870—the beginning of the second era in meat packing—there were four things wished for and necessary for the further extension of the meat industry now drawing raw supplies from one end of the country and delivering the finished product at the other. These requirements were means and methods:

1. To prevent premature decay of perishable products.
2. To lengthen the period of consumption and thus greatly increase production.
3. To enable the owner to market his products at will.
4. To make possible transportation in good condition from the point of production to point of consumption, irrespective of distance.

These aims began to be realized in the decade 1870–1880, and from the experimental progress made in those years dates the entire modern industry of refrigeration and the remarkable results of its application in meat packing.[1]

Early Experiments in Refrigeration

It must not be supposed, however, that the idea of refrigeration is as new as that. As far back as 1550 Blasium Villafranca, a physician in Rome, produced an artificial reduction of temperature by dissolving saltpeter in water, and in 1607 the first "frigorific mixture" was discovered by Latinus Mucredus, who by combining snow with saltpeter produced very low temperatures. Francis Bacon was also credited with experiments along this line and, indeed, died from a cold contracted by stuffing a chicken with snow. The chief incentive of most of these early inventors, however, with the exception of Bacon, was simply the production of ice, until the requirements of the brewing and meat industries called out mechanical refrigeration.

In the middle of the eighteenth century scientists were experimenting upon "nature's abhorrence of a vacuum." to produce evaporation and refrigeration. It was by the application of this principle that Dr. William Cullen invented in 1755 an ice machine which was the first to produce ice by purely mechanical means. He reduced the atmospheric pressure upon water in a closed vessel with an air pump, the evaporation from the surface of the water being so increased as to produce intense refrigeration and ice. This was the pioneer ice machine of any kind.

In 1824 Vallance patented an ice machine in which a current of dry rarefied air was circulated over shallow pans containing water. The air absorbed the vapors of the water, and the heat necessary to produce these vapors was taken from

[1] For the most readable account of the development of refrigeration in the United States, see article by I. F. Nickerson on that subject in *The National Provisioner* (Nov. 28, 1891), Vol. III, No. 8.

the main body of the water and froze it. The air thus laden with moisture was passed over concentrated sulphuric acid, which absorbed the watery vapors, and made the air fit again for taking up new vapors from the water to be frozen. Thus a continuous process was established. It was about this time that the Royal Institute of England was founded, and Sir Humphrey Davy and Michael Faraday demonstrated that pressure heats the gas, after which it is released to condensers where it liquefies.

Early American Inventions

Jacob Perkins, an engineer and inventor, born in Newburyport, Massachusetts, July 9, 1776, is generally accorded the credit of inventing the first machine which was the forerunner of the modern compression apparatus capable of producing ice in commercial quantities. His patent was obtained in England in August, 1834. The refrigerant employed was ether. The evaporator containing the liquefied ether enclosed a system of pipes, through which brine circulated the temperature of which was thus lowered to 5 degrees F. The brine was then passed into a long receptacle containing boxes filled with water, and having frozen their contents, was piped back to be subjected again to the refrigerating effect of the expanding ether.

Thus the cycle was completed and the principle established, upon which most modern refrigerating machines are founded. The brine, or indirect system, was thus foreshadowed. The Perkins apparatus included the four principal features still in use in all compressor systems today: viz., the compressor, the condenser, the expansion, or regulating valve, and the evaporator.

Professor A. C. Twining of New Haven was the next prominent figure in the invention of ice-making machinery. His patent, dated 1853, corresponds closely in time with that of Dr. John Gorrie, whose patent in 1851 was the first in the

United States for the manufacture of ice by mechanical refrigeration.

A few years later, 1858–1860, Ferdinand P. E. Carré of France placed upon the market a machine which gave birth to the ammonia absorption machine system of today. This really established the modern frozen meat trade, which has been of such commercial and physical benefit. The original machine was a very crude affair, consisting merely of two vessels, one surrounded by cold water, the other containing the ammonia and water. The original patent in this country was dated October 2, 1860, and was reissued February 18, 1873.

First Cold Storage Plant

From the practical application of the progress of invention in refrigeration made thus far, the modern frozen meat trade in the United States appears to have originated at the end of the Civil War in 1865, with A. and E. Robins, dealers in poultry and game, Fulton Street Market, New York City. D. B. Beemer, of Omaha, Nebraska, who at that time was in the same line of business, was naturally curious as to the secret process of preserving, and describes his experience, telling what he learned of the novelty as follows:

> On obtaining access to the room my hurried glances about revealed V-shaped galvanized iron tanks hanging down three or four feet from the ceiling (to which they were attached) and glistening with frost, while there were also broad, flat, shallow pans, or platforms of galvanized iron suspended by iron rods from the ceiling, at about six feet from the floor, upon which were piles of fine ice and salt. The bottoms of these pans were glistening with frost, as were also the galvanized iron walls of the room, while boxes and barrels of frozen poultry and loose piles of game were scattered about the floor. The tanks and pans, I knew, had salt in them, cutting the ice, else there would have been no freezing or frost. Lead pipes led from both the pans and the tanks to the sewer to carry off the waste water. Back against the sides of the room were side tanks.

This plant embodied in embryo the plans and ideas, which subsequently enlarged and improved upon, formed the basis on which have been built up the most successful systems of modern cold storage involving the use of ice.

I returned to Chicago and at once built a small freezing room in an upper story of A. P. Stanley's commission house on South Water Street, getting my cold from tanks overhead attached to the ceiling. It proved a success.[2]

Compressed Air Machines

In the early seventies the so-called cold air or compressed air machines monopolized to a great extent the attention of both inventors and the commercial world of refrigeration. Franz Windhausen of Brunswick, Germany, was the foremost exponent of this type. His first patent in the United States was issued in 1870. The principle was this: The air was compressed, then passed through a cooler, and after that expanded to remove the heat or produce cold. It was in 1878 that he invented his compound vacuum pump for producing ice on a great scale.

From 1873–1875 another German inventor, Professor C. P. G. v. Linde of Munich, introduced his ammonia refrigerating machine. He is now generally considered one of the foremost early exponents of the compression system. This machine was patented in the United States in 1880.

Meat Packer Inventors

Not all these inventors were of the professional class, however, for some practical meat packers aided in the development of refrigeration. An outstanding example was Thomas D. Kingan of Indianapolis, who took out a patent in 1873. Just previous to the time, when ice machinery became reliable for refrigeration, he used a large back-and-forth coil of 12-inch pipe laid in returns in a tank about 12 by 60 by 4 feet deep. On top of this pipe he put crushed ice and salt, blowing air

[2] *Ice and Refrigeration* (Sept., 1901), Vol. XXI, No. 3, p. 78.

through the pipe into the rooms where the beef or pork was hung or cured. As the return suction came from the other end of the rooms he succeeded fairly well in cooling his packinghouse, until later on he put in some absorption ice machinery of his own designing. In 1875 representatives of a company in Texas went to Indianapolis and arranged with Mr. Kingan to build one of them in its abattoir in Denison, Texas, the results of which proved excellent.[3]

One of the earliest inventors and builders of refrigerating machinery in this country was Thomas L. Rankin, a native of Ohio, whose first experiments were conducted in the South. His machines were of the absorption type and were used in breweries. The application of Rankin's apparatus included its use for beer coolers, cold storage houses, and the refrigerating of packinghouses and breweries and vessels carrying meats. Rankin's first patent was granted March 28, 1876, and a remarkable success was made of this by David Boyle.

First Chicago Refrigerating Plant

As a result of the development in refrigeration a considerable number of companies were formed from 1876 to 1880 to manufacture ice-making and refrigerating machinery. It was in 1880, for example, that W. B. Allbright, of the Allbright-Nell Company, Chicago, installed the first refrigerator plant in the Chicago packinghouses. In a short time every well-equipped slaughter house had its own chill and refrigerator rooms, in which the meat products could be kept wholesome for long periods of time.

Much remained to be done, however, in order to apply the principles of refrigeration to the meat packing industry in such a way as to make its distribution nation wide. The next problem was to apply refrigeration to transportation. The refrigerating apparatus used for stationary plants is not suit-

[3] Prospectus of the New York and Texas Beef Packing Company for packing beef in Texas by means of the processes patented by D. E. Somes of Washington, D. C

able for a freight car, where the requirements are that the apparatus shall not be unduly heavy or bulky, and that it must be of sufficiently simple operation for a person of ordinary intelligence and without mechanical training.

Applying Refrigeration to Transport

It was during the period of railroad growth and general commercial activity following the Civil War that attempts were first made to maintain in a car a temperature at which perishables could be preserved. In his study of the development of private freight cars, L. D. H. Weld states that the earliest attempts to refrigerate freight cars were probably those made by the Michigan Central Railroad in the early sixties in carrying fresh meat from Chicago to New York or Boston. Ordinary box cars with bins for ice built in both ends were used. A platform built about 3 feet from the floor at each end of the car formed the bottom of the bin. A heavy door the width of the car was hinged to the roof. This door was raised to permit ice to be piled on the platform. It was then lowered to keep the ice from shifting. About 2,000 or 3,000 pounds of ice was placed in each bin. Metal basins were placed to catch the drip of the melting ice, and a pipe drained this through the bottom of the car. This car was inconvenient in that it could be iced only when empty, and inefficient in that it seems to have been able to preserve meat for a few days only. Certainly the temperature could not have been low and no circulation of air was provided.

> Some successful shipments, however, were made in these cars from Chicago to New York by attaching a carload of meat to a passenger train as far as Suspension Bridge, New York, near Niagara Falls. It was there transferred to a fast freight train to New York. In this way meat would arrive in New York City within three days after being sent and was usually in good condition. The limited time which the shipment could be in transit, however, and the expense involved in this part passenger

service prevented this method of transportation from being extensively used.[4]

About this same time the Pennsylvania Railroad set aside some thirty box cars for experimental purposes. These, under the direction of W. W. Chandler, who for a number of years was head of the Star Union Line, were fitted with double sides and the space between packed with sawdust. For cooling purposes a box filled with ice was placed on the floor of the car and the door sealed. This car became a large ice box on wheels. The cooling arrangement was changed somewhat later in that the ice instead of being held in a box placed in the body of the car was contained in two chests, one at each end of the car, hung by wire bands from the roof. This car had practically the same objectionable features as did the car of the Michigan Central, in that it could be iced only from the body of the car and it was without circulation of air.[5]

Refrigerator Car Patents

The first American patent for a refrigerator car was issued on November 26, 1867, to J. B. Sutherland of Detroit, Michigan. His car was so constructed that the air admitted at the top passed down through the ice chamber and was discharged into the cooling room near the bottom to reduce the temperature. His claim covered a car with double walls, roof, and bottom with ice chests at each extremity, closed by hanging flaps and having spaces so arranged as to produce a constant circulation of air in the car. From that time on patents for refrigerator cars came fast.

In 1868 George K. Wood of Morristown, New Jersey, brought out a car with a plurality of metallic chambers for the acceptance of way and through freight with an ice chamber above. During the same year William Davis of Detroit, who had been experimenting for three years on refrigerator cars, took out patents dated June 16, and September 15, 1868. The

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[4] Report of Federal Trade Commission on Private Car Lines (1920), p. 26.

[5] The following extract from Mr. Chandler's memoirs, as cited by C. H. Taylor in his "History of the Chicago Board of Trade" (Vol. I, pp. 369, 370) is of interest: "I had never seen or heard of a 'refrigerator car' at that time nor did I dignify them with the name refrigerator cars, but christened them 'ice-boxes on wheels.' I did not get a patent, but later sundry other people did varying the construction."

Davis car became the best known of the early types and was used considerably during the next few years. Its performance, however, was not wholly satisfactory, and not infrequently was it referred to as the "sweat box," a name probably due to the same fault which had been common in all the earlier experiments, namely, that the car had no provision for circulation of air. The cooling system of this car seems to have differed slightly from other types, in that cylindrical metal tanks of about 15 inches in diameter were placed at each corner of the car. It appears for some shipments, at least, that the ice in these tanks was mixed with salt to obtain a lower temperature.[6] It was in this car that the first successful shipment of dressed beef was made in September, 1869, which was the real beginning of the dressed beef industry.

The car of A. L. McCrea of Chicago, patented in March, 1869, had interior movable sections, and that of Thomas L. Rankin of Granville, Illinois, patented in December, 1870, was built with ice boxes raised above the roof of the car on either side of the brakeman's walk.

Cars Had to be Simply Built

Some of the American inventors seem to have tried to produce a car with as many mechanical complications as possible, forgetting that all machinery which must be operated and handled by inexperienced labor should be as simple in mechanism as is consistent with the duties it is expected to perform. For example, C. L. Haag and E. Ely of Lockport, New York, found this an obstacle to extensive use of their car. It was cleverly designed, having an ice box at one end of the car with a complicated system of air passages and valves for the regulation of the air currents to the preserving chamber. It had also an observation chamber.

In 1871 A. S. Lyman in New York forced an air current

[6] Federal Trade Commission Report on Private Car Lines (1920), p. 26. Weld, L. D. H., Private Freight Cars and American Railways, p. 12.

under the roof over the ice into the cooling chamber by means of a wind wheel on the roof of the car. A year later Richard J. Tunstall of St. Louis, Missouri, whose patent was taken out in September, 1872, approached simpler methods and cooled his car with a V-shaped iced receptacle running through the car from end to end and filled from the top, having vertical drips at either end. The Tiffany car patented about this time followed this idea, having two ice bunkers, one on each side of the car. Still later, in June, 1874, H. W. Sanborn of Rochester, New York, made an entirely new departure by producing a car which was automatically self-cooling without the use of ice, being cooled by evaporation of water.

First Refrigerator Car Shipments

By this time several of the packers in Chicago, who were conducting business in the old-fashioned way, and a number of cattlemen who later were to be big packers in the new way, were making experiments with refrigerator cars, feeling that here was a possible means of adding a new feature to their business, a dressed beef traffic to all parts of the country.

The earliest packer to experiment was G. H. Hammond of Detroit, who built a fairly successful meat refrigerator car in 1871. Although not credited with the first shipment of dressed meat from the Middle West to eastern markets he was the first to market western beef by sending it the entire distance by freight. What type of car he had is not quite clear, but the meat came in contact with the ice and became discolored and spoiled rapidly when removed.[7] "To remedy this difficulty cars were so equipped that the meat could be suspended from the rafters and ceiling, with the result that when the car was in motion and going round curves, the halves of meat were set swinging like pendulums and finally communicated their motion to the car."[8] This caused several wrecks.

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[7] Federal Trade Commission Report on Private Car Lines (1920), p. 28.
[8] Armour, J. Ogden, The Packers, the Car Lines, and the People, pp. 19, 20.

The next step was the partitioning off of an ice bin or bunkers at one end of the car, the meat being suspended in the body of the car. This was an improvement and meat carried in the cars arrived in better condition.

At the time of these early experiments of shipping fresh meat under refrigeration, Nelson E. Morris was one of the largest cattle dealers in the Chicago market. In addition to dealing in livestock, Morris had operated a packing plant since 1859, and had built up a considerable business in the shipping of packed meat, as well as the local selling of fresh meat. Considering how he might enlarge his market for fresh products, in the winter of 1874, Morris had risked sending a load of frozen beef to Boston in a box car. The meat arrived in good condition and a market for it was found. The following year numerous shipments of this sort were sent, with, generally speaking, good success. The venture was, however, necessarily confined to a small portion of the year, and even then, dependent as it was upon the variations in the weather, it could not become general or extensive. The risk was too high—the loss too great. Evidently Morris was not familiar with the refrigerator car or he did not consider it a practical carrier for his business.

Refrigerator Cars a Commercial Success

One of the most influential figures in the commercial development of refrigerator cars was Gustavus Franklin Swift. He aided materially in revolutionizing the meat industry, creating the dressed beef traffic and the distribution system of the modern packing industry. There are few instances of as great courage in commercial history as he and his associates showed in this struggle. This is a story that will be treated in the following chapter. At this point it is sufficient to note that in his search for a better car G. F. Swift was instrumental in discovering the true principle of refrigeration for freight cars. For he secured the assistance of an

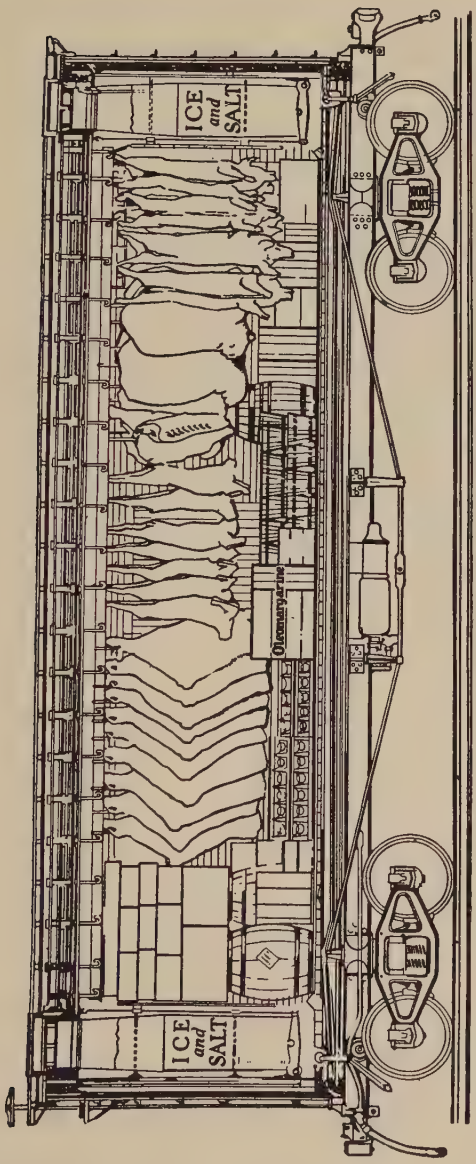
engineer in Boston, named Chase, who discovered this principle, namely, "that a current of air allowed to pass through an ice bunker in the upper corner of a car becomes chilled so that it is heavier than the air with which it comes in contact, and consequently sinks and circulates through the car, the warm air passing out through the ventilator."[9]

Chase not only discovered this principle, but he also devised a practical method of applying it by fastening an ice bunker in each end of the car. The bunker is filled from the exterior of the car through an opening in the roof. This is closed by a plug, which fits into the opening and is further sealed by a hatch door in the roof of the car. The principle of circulation of cool air and the general arrangement of the appliances of this car by which the bunkers could be filled or replenished from the outside, are still in use, though various refinements for convenience or efficiency have been introduced. The car designed by Chase demonstrated its worth at once. Other packers followed in its use, among them Armour and Company, Nelson Morris, Schwarzchild and Sulzberger, and other smaller companies.

Refrigerator Revolutionized Meat Industry

The refrigerator car made possible the development of the great centralized packing industry. Before its use slaughtering was a local business; now fresh meat shipments are a part of international commerce. Without the refrigerator car ordinary improvements in transportation could have affected the packing business but little. Cheaper transportation could not increase the market materially. Faster transportation could make but little difference, for regardless of the speed of the train, the meat would spoil before it could be transported if mechanical refrigeration were not provided. The only meat products which could be shipped were those which had been dried, cured, canned, or otherwise preserved. As

[9] Weld, L. D. H., Private Freight Cars and American Railways, p. 16.



Courtesy Commerical Research Department, Swift and Company

Figure 12. Interior View of a Loaded Modern Refrigerator Car

has been stated, many of these products were packed in containers with salt or brine, from which fact the "packinghouse" takes its name.

Previous to the refrigeration period the fresh or dressed meat business was in the hands of those butchers who slaughtered in or near the community where the meat was to be consumed. With the advent of the refrigerator car a revolution swept over the meat industry. The fresh meat and the perishable packinghouse products could now be shipped to any point. There were, of course, difficulties to overcome—the imperfections of the car itself, the prejudice of the buying public against refrigerated meat, which was industriously fostered by local butchers and cattle shippers, and the hostility of the railroads. The modern packing industry, however, was thus started in response to an economic necessity. In face of that fact the obstacles had to give way.

CHAPTER XI

DEVELOPMENT OF THE DRESSED BEEF TRADE

The New Packers

Until the last quarter of the nineteenth century fresh meats and their distribution were everywhere under the local control of the retail butcher. This was especially true of beef, which was sold dressed for consumption. During the early period of meat packing the name given to men engaged in that business was "pork packers," for they packed pork products. Beginning with 1875, however, the term had to be changed to "meat packers," for in that year there appeared the new packers who were cattle dealers, as, for example, Nelson Morris and G. F. Swift. The change in name connotes a great advance in methods in the American meat industry. Having solved the problems of pork, it tackled the problems of beef, especially that of slaughtering and distributing wholesome fresh meats to the country.

Early Methods Often Unsanitary

Before 1875 local butchers in the United States supplied themselves with meat from the following sources:[1]

1. Some few meat dealers, especially those of the cities or larger towns, obtained all their meats from the large packinghouses and they did no slaughtering. This class was not affected by the change, since they were getting the benefit of modern methods.

[1] The contents of this chapter are for the most part based upon personal investigation among retired and active meat men, local butchers, branch house managers, and cattlemen throughout the East and Middle West. The story is therefore absolutely new to written record.

2. In some cases meat men did their own killing, but had no regular place for slaughtering. These men would drive from farm to farm and buy one or two animals, which they killed at the place of purchase, throwing the offal of the slaughtered animals to the farmers' hogs. They would take the dressed or partly dressed carcass to their meat shop and place it on the block.

3. In numbers of cases small dealers who had no slaughter house of their own did all of their killing at slaughter houses controlled by other local butchers.

4. In some cases the farmers slaughtered their own animals and brought them to town dressed or partly dressed, selling them in halves or quarters to the local butchers or to families, hotels, and restaurants. The farmers were in the habit of feeding the offal of slaughtered animals to their hogs.

5. The majority of the local dealers in small towns owned or rented slaughter houses. In nearly all cases these houses were located on, or just beyond the town limits. They were frame structures, generally of one room, built directly on the ground or raised several feet and surrounded by a small yard or, in many cases, situated in a large field.

Farm Killing Drawbacks

In the greater number of cases the butchers controlled a small piece of land, and, as a rule, hogs were kept on the premises to eat the offal. In many instances the houses were located on the banks of rivers or creeks, into which the premises drained. Frequently the offal was thrown down an embankment toward the water, and left there to be eaten by the hogs and rats or to decay and drain into the stream. In some cases the slaughter houses were located on farms. These farms were either owned by the butcher, or a farmer would give the use of a piece of ground on the corner of his premises to the butcher for his slaughter house in return for the use of the offal as food for his hogs.

A very important matter from the standpoint of public hygiene was that in case a town was provided with more than one slaughter house, they were rarely segregated, but were scattered north, south, east, and west, each butcher apparently trying to place his house in such a position as to prevent any undue amount of curiosity on the part of his competitors as to the character of his stock.[2] Fortunately, slaughtering on farms was not of necessity unsanitary.

Ways to Prevent Disease

Such a state of affairs as that described meant that every slaughter house might prove a center of disease for the surrounding country, spreading trichinosis, echinococcus diseases, wireworm, and other troubles caused by animal parasites, tuberculosis, hog cholera, swine plague, and other bacterial diseases. In the spread of these diseases offal feeding, drainage, rats, and dogs were important.

It was pointed out that these diseases could be greatly held in check, and, in some cases, entirely eradicated in two ways: first, by a reduction in the number of premises on which slaughtering was allowed, on which account it was urged as all important that there should be a segregation of the slaughtering houses, so that all the butchers of any given town would be compelled to do all their killing in a common enclosed and restricted area; second, by regulating the factors concerned in spreading the diseases.

The part of the country to take the earliest steps to change this unsatisfactory and dangerous situation was the extreme East, where the problem of supplying dense urban populations with meat was most difficult. From 1870 to 1875 New York City and Boston attempted to solve the problem, and their work had important effects on the subsequent development of the meat packing industry.

[2] It is not intended to convey the impression that slaughtering on the farm need be unsanitary. See Boss, Andrew, Meat on the Farm, U. S. Department of Agriculture Farmer's Bulletin No. 183.

Urban Problems to be Solved

In 1870 the Massachusetts State Board of Health in its first annual report set forth the results of their investigation into "Slaughtering for the Boston Market," in which reform was urged on the grounds of public health and economy. For example, in Brighton, annexed to Boston in 1874, there were in 1868 about 50 slaughter houses in full operation, in which were slaughtered 53,000 beeves, 342,000 sheep, and 144,000 hogs annually. None of these establishments was big, but in each the business was carried on in an unsatisfactory, clumsy, and wasteful manner, without proper regard to cleanliness.

In addition to all these slaughter houses there existed in Boston proper, Cambridge, Charlestown, Brighton, Roxbury, and neighboring towns, a number of establishments where the feet, tallow, and bones, collected from the former places, were carried to be melted and boiled. The air for miles around was contaminated by foul odors from vats and badly constructed chimneys. The blood of animals slaughtered in Brighton was for the most part lost, being allowed to run off into the pig pens where that part which was not consumed by the hogs was allowed to lie and putrify in the sun, thus adding to the unwholesome character of the place. Only a very small amount of the blood was used in any way, and never more than 1 cent a gallon was realized from the sale of a small part of it to sugar refiners. The refuse portions of the animals slaughtered were used to feed hogs, which were fattened for the market.[8]

The Committee of the Massachusetts State Board of Health visited New York, where they found conditions somewhat more sanitary, but the slaughter houses were also too numerous there and agitation was on foot to reform matters. Indeed, in 1874 the medical board of the Roosevelt Hospital protested against laxness in allowing unregulated slaughter houses.

[8] The Brighton Abattoir, p. 1.

Remedies Urged

The remedies for this unsanitary state of things were definitely stated by Dr. George Derby, secretary of the Massachusetts State Board of Health.[4] They were the concentration in large establishments of the business of slaughtering, where every part of the animals could be utilized on the spot in the most cleanly and economical manner without bad odors or waste. Certain essentials representing a great advance in ideas were declared necessary for slaughter houses.

These essentials were: (1) a pavement of stone or some material impervious to blood, (2) an abundant supply of water, (3) complete drainage, (4) vats for the "rendering" of fat and offal on the spot before putrefaction set in, (5) the means of converting blood into blood albumen.

The sanitary advantages of such a system were: (1) the removal of offensive odors, (2) the removal of slaughter house hogs from the market, (3) the ready inspection of meat, thus insuring the rejection of that unfit for food.

The economical advantages were: (1) diminished liability of having meat spoiled by exposure to the emanations from the putrid pig pens, (2) the value of the blood which would be saved and utilized, (3) the savings which must always accompany order, system, the division of labor, the avoidance of transportation, and the doing of any business on a large scale, (4) the greatly increased value of land in the vicinity of the slaughter houses.

At the same time that the State Board of Health was working on the problem, men engaged in slaughtering knew that the time must come when population would so increase that a change in the way of transacting their business would be needful. Butchers also were being educated up to the point of seeing that their methods were not as good in some respects as those used elsewhere.

[4] See Report of the Sanitary Committee of the New York Board of Health on the Concentration and Regulation of the Business of Slaughtering Animals in the City of New York (1874), which was the result of this agitation.

In 1870, through the efforts of the citizens of Brighton, an "Act incorporating the Butchers' Slaughtering and Melting Association" was passed by the Massachusetts legislature. By the terms of this act a corporation was formed for the purpose of carrying on the business of buying and slaughtering cattle, sheep, and hogs and of melting and rendering the refuse fat and various ramifications of the work. The capital stock was to consist of $200,000, divided into lots of $100 each. The corporation was to obtain a lot of land and erect buildings. Each member of the corporation was to have the right to slaughter on the premises, and the corporation itself was to be allowed to manufacture and sell any of the usual products of such a business, or it could lease the privilege to others. The selection of the land and general methods were under the supervision of the Board of Health. The act further provided that the Board could under certain conditions order any person engaged in the business of slaughtering within 6 miles of Fanueil Hall Market in Boston, to transfer his business to the abattoir in case it was carried on elsewhere in a manner "injurious to the public health."

The passage of this act was bitterly opposed, and it was necessary for the legislature to enact another law in 1871 entitled "An Act Regarding Slaughter Houses and Noxious and Offensive Trades." This act prohibited the establishment or extension of any building for slaughtering or rendering, or for any noxious or offensive trade in any city or town of over 4,000 inhabitants without license, since the mayor and aldermen and the Board could order anyone engaged in the business to desist from it.

Concentration of Slaughtering

After long delays and negotiation between the Board and the butchers, the majority of the latter finally agreed to cooperate with the Board when they realized that the new abattoir would be to their advantage. Thus the Butchers'

Slaughtering and Melting Association came into existence and became a success.

This movement towards concentration of slaughtering, with its effect in improving the quality of dressed meats for the Boston market, was very significant, for it was maturing from 1870 to 1875 and came to fruition in the very years that Gustavus F. Swift, who was to be one of the leading figures in the modern meat packing period, was doing business there in a small way as a cattle dealer and slaughterer. The success of concentration of slaughtering brought to the notice of Swift and others some of the ideas later worked out by the new group of packers on a larger scale for the whole country, since they were able to study there the problems of concentration of cattle and slaughtering and marketing of meats.

Too much has sometimes been made in historical studies of mere coincidences in dates; but it is significant that in the very year G. F. Swift went to Chicago, P. D. Armour also made the headquarters of his already large and well-known pork packing business in the same city, and in that year the report of the secretary of the Chicago Board of Trade stated that "the shipment of dressed beef from this city to the eastern markets has grown within the last few years to a very important traffic."

Beginnings of a Dressed Beef Trade

It should be remembered that dressed beef shipments did not begin with G. F. Swift and P. D. Armour. Some time before this, as has been noted already, G. H. Hammond, an energetic packer, had shipped some dressed beef to eastern markets. There had also developed in 1875 a trade from Kansas City to the East. In the autumn of 1875 Nofsinger and Company of that city sent the first shipment of dressed beef, consisting of the carcasses of 103 head of cattle, two carloads of which were forwarded to Philadelphia and one car to Boston. The rate of freight to Philadelphia was 65

cents per hundredweight, and 75 cents was the charge to Boston.[5]

Meantime, certain cattle dealers and slaughterers in the East saw a chance to increase the profits of their business. G. H. Hammond's experiments in sending beef to Boston and Lowell were known to H. A. Botsford and Company of Hartford, Connecticut. They wrote to Hammond and after some correspondence in 1875, the latter bought and dressed cattle in Chicago for the eastern firm. This continued for some two or three years when the firm sold out, and Hammond made arrangements for the selling of his beef on commission.

One of the men in the Botsford firm, Henry G. Taylor, suggested to Hammond the advantages of having some headquarters near Boston. Finally he located at Worcester and built a warehouse which was opened in August, 1877, on land given by the Boston and Albany Railroad, alongside their station. This was for the purpose of handling exclusively Chicago dressed beef and was the first house of its kind in the United States.

Making a Commercial Success

In spite of this dressed beef traffic, however, the business of shipping dressed beef could not be said to have been a success before the time of G. F. Swift. As Charles Winans has pointed out, powerful interests which shipped live cattle from Chicago to the East and which owned stockyards at Cleveland, Buffalo, Albany, Pittsburgh, Boston, and other places were opposed to the development of the dressed beef traffic which would, they foresaw, mean the inevitable decline of cattle shipping.

Although undoubtedly he saw the possibilities in the dressed beef trade, G. F. Swift did not engage in it at once.

[5] First Annual Report U. S. Bureau of Animal Industry (1884), p. 265. From 1875 to 1879 Nofsinger and Company shipped dressed beef to Chicago, St. Louis, Baltimore, Philadelphia, Boston, and other eastern cities with varied results. The railways advanced their rates from time to time until the firm mentioned was forced to stop its shipments of dressed beef.

Winans tells an interesting, but totally imaginative story about G. F. Swift talking over the shipping of dressed beef to eastern markets with Herbert Barnes of New Haven in 1875, as they sat on a fence in the Chicago Stock Yards, and convincing him that dressed beef could be sent to the Atlantic seaboard with the use of refrigerator cars, arriving in as good condition as when it left Chicago. Swift was to look after the production and transportation, and Barnes the education of the eastern consumer to the fact that western dressed beef was as good as home dressed meats.

The facts of the story seem to be that for the first two years after reaching Chicago Swift was engaged in buying and shipping livestock. It was only in the late fall of 1877 that he began to ship dressed beef. Augustus Hirsh was employed by Swift to try an experiment with dressed beef. He had killed enough beeves to load two National Dispatch box cars. The sides of beef were suspended from an improvised rack made of two-by-fours and cross-pieces, a rather crude contrivance. These two cars were not iced. So the doors were opened about a foot for ventilation and refrigeration. Hirsh always related with pride that he had the honor of taking these two cars of beef along with his cattle on this pioneering expedition to the East.[6] This winter shipment was successful, and from it dates the remarkable episode, as yet unwritten, of the fight to get dressed beef into the markets of the country.

Dressed Beef in New England

It was quite natural that G. F. Swift should first try to introduce dressed beef into his native New England where he was known, and that he should rely on the co-operation of his younger brother, E. C. Swift, in this commercial struggle. So "G. F." shipped his beef at first to Clinton, Massachusetts, where "E. C." had a butcher shop and slaughtering business.

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[6] This story was told by A. Hirsh at his ranch in Sheridan, Oregon, to M. G. Middaugh, head of the branch house department of Swift and Company.

But "E. C." did not have room enough in Clinton to store the beef, so he sold part of it, as it came in, to neighboring towns, such as Fitchburg, in competition with the local butchers. In a short time another brother, William Swift, was put in charge in Fitchburg.

In order to have his beef running continuously to the East, G. F. Swift determined to make shipments in such a way as to preserve it in better condition; and to send it by regular routes. The Michigan Central had been carrying some dressed beef, but it was insignificant in amount, and as the railroad officials were unfriendly to the business, they increased the rates to make it unprofitable.

The employees of the railroads also neglected to supply the cars with ice while in transit, and the beef would frequently reach its destination in bad condition. Delays in transportation also were disastrous.

Packers Forced to Build Cars

G. F. Swift showed his keen business sense by approaching the Grand Trunk Railroad, which did not handle much livestock on account of its roundabout route, and was, therefore, not opposed to the development of the dressed beef traffic, to handle the cars for Swift and Company. After negotiating with this railroad, Swift found it would handle his beef, but that he himself would have to furnish the refrigerator cars. Although this arrangement would involve a great expenditure of money at a time when he had but little working capital, he had no alternative but to build the cars himself, if there was to be carried out what Dr. Weld calls "the gigantic project of developing an extensive market for dressed beef in the East."[7]

The accomplishment of this project by Swift and other competing packers took some ten or twelve years. In many places, including such cities as Boston, the dressed beef was

[7] Weld, L. D. H., Private Freight Cars and American Railways, p. 17.

introduced by sale at auction to demonstrate its good quality.[8] Besides, at nearly all places western meat of equal quality sold at ½ to 1 cent a pound lower than did home fresh killed beef.

The brothers, G. F. Swift and E. C. Swift, spent much time visiting local slaughterers and butchers throughout the East, urging them to give western dressed beef a trial. At the same time G. F. Swift's policy was not combative, but co-operative. He still shipped live cattle, even sending to those who also handled some of his dressed beef.

Partnerships with Local Slaughterers

In some towns, such as Lowell, Fitchburg, Fall River, Worcester, Massachusetts; Providence, Rhode Island; New London, New Haven, New Britain, Connecticut; Paterson, New Jersey; Philadelphia, Washington, Pittsburgh, and Rochester, Swift endeavored to win the most important man in the business. The local slaughterer in New England and other eastern towns was usually a man of importance in the community, because the business required considerable capital to finance plants and supplies of raw materials. The plants were often the biggest things in the town, next to the mills. For the introduction of dressed beef nothing could have been shrewder than Swift's policy, for by the time the chief slaughterer was won over there was already a clientele trade and capital to finance the local business.

This alliance with business already established brought success. The usual method was to form a partnership in which the local slaughterer, G. F. and E. C. Swift each held one-third interest, which incidentally gave the Swifts control.

[8] The details of this are interesting. "The proposed sale of western dressed beef by auction in the Boston market is taking definite shape and the enterprise will probably be inaugurated at once. The plan is to sell the beef directly from the refrigerator cars at or in the vicinity of the depots shortly after arrival. Certain hours will be fixed for the sale on each day which may be most convenient for the consumer or provision dealers to attend. It is proposed to sell the beef in pieces small enough to suit families so that the profit of the middleman or dealer may be saved to whomsoever cares to do his marketing in that way. But in any event, when the beef is sold direct from the cars to the provision dealers throughout the city who now have to go down to market for it, there will be a considerable saving in expense and Bostonians can get cheaper beef." (Quoted by the *Cincinnati Price Current* [March 19, 1885], Vol. XLII, No. 12, from the *New England Grocer*.)

Some partnerships were on a fifty-fifty basis. The meat was consigned to these partners throughout the East, and they received commissions, in some cases 40 cents a hundred, in others 50 cents a hundred pounds. There were a great many of these partnership arrangements. In addition, there were a few straight consignee arrangements, as in Paterson, New Jersey. Swift's business extended rapidly from north to south, along the Atlantic seaboard. On September 3, 1879, the first car of dressed beef was received by Hyde, Wheeler and Company, commission merchants at 41 North Market Street, Boston.[9] In Springfield, Massachusetts, George Nye and Company shortly began to handle dressed meat. In Providence, Rhode Island, in 1881, Edwin Tetlow and Company started business for G. F. Swift.[10] By 1882 Washington and Baltimore were added to the list.[11]

Armour Adds Dressed Beef to Pork Trade

During these years P. D. Armour also had become interested in dressed beef. Prior to the advent of the dressed beef trade he had been a pork packer and had built up his business which was known all over the world. He had, of course, slaughtered and dressed cattle for local use. He was shipping pork and cured hog products to the New York and Boston markets, but with his keen business insight he saw the significance of the dressed beef trade and realized that he must be in a position to offer diversified products to fit in with his pork provision shipments. His already nation-wide distribution system could thus be utilized to better advantage. Devising a car, he sent his first shipment east to Boston. This market had been held by Hammond because he controlled by special arrangements beef shipments by freight over the Michigan Central, New York Central, and the Boston and Albany Rail-

[9] *The National Provisioner* (Nov. 7, 1908), Vol. XXXIX, No. 19, p. 19. L. B. Noyes, President of T. H. Wheeler Company, corroborates this.

[10] Letter of G. F. Swift to Edwin Tetlow, October 17, 1881. The spirit of co-operation rather than combativeness in introducing dressed beef is shown in these letters.

[11] *The Cincinnati Price Current* (Oct. 5, 1882), Vol. XXXIX, No. 40.

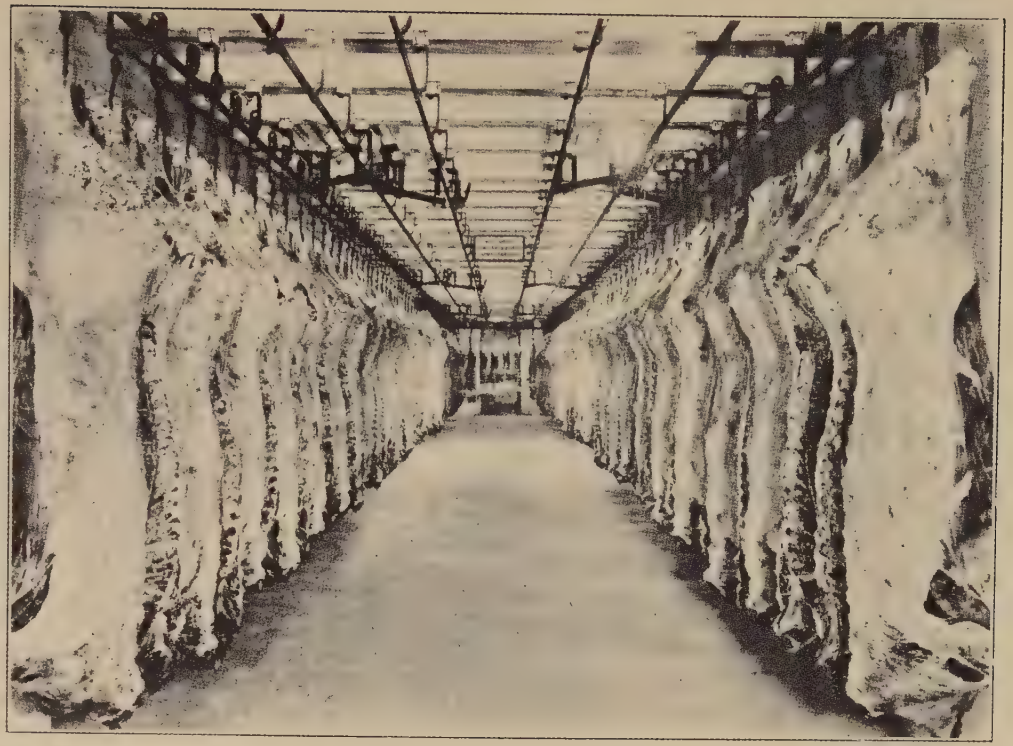

Figure 13. Dressed Beef in Cooler

roads.[12] Later G. F. Swift had entered that market in New England by way of the Grand Trunk.

P. D. Armour adopted a more centralized policy than did G. F. Swift in introducing dressed beef into the eastern markets. This was quite natural, for Armour already had his own distributing agencies. Both Armour and Morris discovered, as did Swift later, that local consignee arrangements at best are temporary. With a second generation it was hard to maintain continuity in policy, for there was often a lack of interest, lack of business ability, and financial troubles. Armour established branch houses, or selling agencies under a salaried manager. In that way a permanent policy and institution was set going.

Fight to Establish Dressed Beef

The fight to get dressed beef into the markets of the country lasted until about 1890, and was as bitter a one as commercial history records. The railroad interests were opposed to it and tried to prevent it from increasing; the public in the East was prejudiced against the chilled meat, considering it to be unhealthy and unfit for food and believing it had to be treated with chemicals when shipped long distances; and lastly, the local butchers throughout the country fought this new dressed beef traffic in all possible ways—by boycott, press propaganda, federal government investigations, and state legislation. It is this significant struggle which is worthy of special attention.

The first opposition encountered by the sponsors of the dressed beef trade was when the progressive packers asked the railroads to furnish refrigerator cars, which they refused to do. The railroads considered the refrigerator car to be a speculation. The construction of the car was expensive, and even if fresh meat could be shipped successfully, there was no cer-

[12] *The National Provisioner* (Feb. 6, 1904), Vol. XXX, No. 6. Also Official Journal of A. M. C. & B. W. N. A., No. 8 (May, 1904), pp. 110, 111.

tainty that the volume of traffic which would arise would warrant the capital outlay needed. It was generally supposed at this early date that in warm weather a refrigerator car would be unsuccessful, and that even if the time during which fresh meats could be transported was enlarged, it would still not be a year-round freight movement. Furthermore, the railroads at this time were going through the greatest period of extension in their history, and probably were not interested in investing in expensive and experimental equipment.

Railroads Oppose Refrigerator Cars

The railroads had reasons to discourage the business of shipping dressed meat, as they then enjoyed a lucrative traffic in live animals and were well equipped to handle this class of business. A stock car was more advantageous for the railroad to own than was a refrigerator car, for when not in use to transport stock, it could be and often was used for other freight. The refrigerator car is not adapted for general traffic, as will later be explained more fully. An additional consideration with the railroads was that the dressed carcass of a steer is less than 55 per cent of the weight of the live animal. At that time, besides the dressed meat, little except hides and fats, constituting about 10 per cent of the live weight, was used. The remaining 35 per cent or more was the waste material which was disposed of near the place of slaughtering. Thus if the railroads were to ship only the dressed meat, hides, and fats, instead of the live animals, they would lose a great amount of tonnage, which they would have transported.

A further reason for the railroads' reluctance to encourage the shipments of fresh meats is found in the influence of the various interests engaged in businesses coincident to shipment of livestock. Among these were powerful cattle shippers, who owned and operated loading docks and feeding stations on the lines of the carriers. Some of these stations were also owned by the carriers themselves, and in furthering the ship-

ment of dressed beef they would destroy the utility of property in which they themselves had money invested.

Railroad Interests in Stockyards

The war between the shippers of live cattle and the shippers of dressed beef from Chicago to the East, was largely an attempt of the Vanderbilt lines and Pennsylvania Railroad, which were heavily interested in great stockyards, to sustain those paying properties along their trunk lines.[13] Thus being equipped for livestock traffic, these roads were allied with the livestock shippers. On the other hand, the Baltimore and Ohio and the Grand Trunk, which were confining themselves to the carrying trade and had no investment in stockyards, were quite willing to afford transportation to shippers of dressed beef.

The livestock men ran western rates up on dressed beef so that they could compete successfully in New York, Philadelphia, and Baltimore with beef dressed in Chicago, or Kansas City, and taken east. For example, in the spring of 1886 the rates on dressed beef were increased.[14] It was urged by the railroads that dressed beef should pay a somewhat higher rate per car than live cattle, because when cattle were slaughtered in the West the valuable parts of more cattle could be shipped in a car than could possibly be shipped if the animals were sent alive. So at the same rates per car the shippers of dressed beef would get their cattle to market at a much cheaper rate than the shippers of live cattle. As the same cattle would have to go in any case alive if not dressed, the railroads concluded to establish such a difference in rate as would give them about the same net income from the traffic and at the same time let the shippers send the beef east as they wished.[15]

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[13] *Cincinnati Price Current* (Mar. 11, 1886), Vol. XLIII, No. 10; also *Breeders' Gazette* (Apr. 9, 1883), Vol. III, No. 16.

[14] Armour and Company entered a strong protest to this action and G. F. Swift contributed an article to a Chicago paper opposing the discrimination against the dressed beef industry on the part of the railroads. The Illinois Railroad and Warehouse Commission met in Chicago to investigate the discrimination against the dressed beef industry. (Taylor, History of Chicago Board of Trade, Vol. II, p. 729.)

[15] *Breeders' Gazette* (Apr. 1, 1886), Vol. IX, No. 13.

The proportional charges on dressed beef as compared with those on livestock had been 64-40. It was proposed to advance them to 77-40.

The trouble was that there was a tendency to overcharge the dressed beef, in comparison with live cattle, though the railroads proper did not make much after the exorbitant charges for feeding and watering in transit. In this fight, however, the future was with the dressed beef, which had a strong case and was bound to win, irrespective of railroad rebates which later it was able to get. The trade was made a success before it was in a position to ask for or receive rebates. When possible, however, rebates were obtained as a matter of course, for that was the custom of all business in those days.

Adjusting Cattle and Dressed Beef Rates

In order to ascertain to what extent complaints made by shippers of dressed beef regarding exorbitant rates were true, and to arrive at a correct relative adjustment of rates of transportation that would not unjustly discriminate against either traffic, a committee investigated the matter. A conference was held in New York, April 11 and 12, 1883, between the Trunk Line Executive Committee, the Chicago Committee, and dressed beef and livestock shippers, regarding the relative cost of shipping dressed beef and livestock from the West to the seaboard. Certain questions were considered as follows:

1. What proportion does the dressed beef bear to the gross weight of the live steer from which it is obtained when the animal is slaughtered in Chicago?

2. If such steers were brought alive to New York, what proportion would the dressed beef obtained from it at New York bear to the Chicago live weight?

3. What is the exact cost of bringing livestock from Chicago to New York in addition to freight charges?

4. What is the exact cost of bringing dressed beef from Chicago to New York, in addition to freight charges including icing and attendance at icing stations, allowing shrinkage, if any?

5. What are the products of the animal other than dressed beef? Specify each product (including hides, hoofs, tongues,

hearts, offal, etc.), giving separately the approximate weights and also the market value of each both at Chicago and New York.

6. What products of the animal other than dressed beef, are shipped from Chicago to New York and marketed in New York at a higher price than they would bring in Chicago; how much higher? also show what portion of the products is not worth more at New York than at Chicago?

In his report on the whole rate question Commissioner Fink stated that if the rate on livestock was 40 cents per hundred pounds, the two opinions were that the rate on dressed beef should be 70 to 86¾ (an average of 78⅜ cents) per hundred pounds. Finally the matter was left to three arbitrators, G. F. Swift, S. W. Allerton, and Judge T. M. Cooley of Ann Arbor, Michigan. It was provided that the award of two of the three arbitrators should govern, and in the event of such a disagreement that no members of the board shared the same opinion, Judge Cooley should act as umpire and his decision was to be final.

The Cooley Award

The result was the noted "Cooley award," which became the basis of the future rate structure. The underlying principle was to charge each interest for the transportation of its freight a sum proportioned to the value of the service, arriving at the value by comparison of market values in New York on lots of live cattle, which were identical in value in Chicago, but delivered the one as livestock and the other as dressed beef in New York, allowing to each shipper the cost of transportation exclusive of railroad charges and inclusive of any loss from shrinkage. Working from this principle the Cooley award stated that the proportional charges should be 70 to 40 cents per hundred pounds. Yet even after the Cooley award, in the spring of 1886, the rates on dressed beef were increased by Commissioner Fink.

Public Prejudice Against Dressed Beef

The second opposition the dressed beef trade had to face and overcome was the vague, but very real prejudice on the part of the consuming public that the western dressed beef was unhealthy. Many butchers in order to sell their meat would display signs, "We use only city dressed meat," or "City dressed beef only," even when they were actually selling western dressed beef. To those butchers who bought Chicago dressed beef it had to be delivered before daylight, so that their customers would not know of it. People would apologize to guests at dinner for having western dressed beef, saying that the butcher was all out of city dressed beef. In consequence, for years western beef sold for a cent or two a pound lower than did eastern beef. Only after several years did people come to realize that meat ought to be kept awhile before it was eaten, and that by the time beef reached Philadelphia from Chicago, that is in four or five days, it was just ripe for eating.

This prejudice, which was widespread on the part of the public, was kept up by the tactics of the butchers throughout the country. They formed butchers' protective associations and retail butchers' associations, and some of them even employed field secretaries to keep the prejudice alive. The fight against dressed beef, however, was merely sporadic for several years and it was only in the middle eighties, when its phenomenal growth was beginning to be realized, that organizations were formed, both state and national, to keep it out. Certain periodicals were established, such as the *Butcher's Advocate* in New York, to discredit the dressed beef interests.

National Butchers' Protective Association

Finally, in May, 1886, there assembled in St. Louis, Missouri, a convention[16] of the new organization, "The Butchers' National Protective Association of the United States of

[16] Sen. Reports, 1st Sess., 51 Cong. (1889-1890), Vol. III, No. 829, p. 150. (Vest Report.)

America." It adopted a constitution and by-laws, of which Article II, states the object of the association as follows:

> The object of this association is to unite in one brotherhood all butchers and persons engaged in dealing in butchers' stock within the states and territories of the United States of America for the following purposes to wit:
>
> First: To protect their common interests and those of the general public in the matter of dealing in slaughtering, handling and selling butchers' stock and fresh meat designed for human food, and to see that such stock be so slaughtered and flesh so handled as to secure the highest sanitary conditions therefor for human food.
>
> Second: To oppose by the whole power and influence of this association the policy and action of all persons and organizations which disregard the public good, and endanger the health of the people by selling for human food diseased, tainted or otherwise unwholesome meat.
>
> Third: To oppose all monopolies and combinations which ultimately injure and oppress the people by controlling and manipulating the market in a staple and indispensable article of human food.
>
> Fourth: To elevate the business to a standard commensurate with its importance to the general public.

The purpose of these organizations was to destroy the dressed meat industry, which was shipping meat from Chicago to eastern cities and selling it for less than the meat killed and dressed by the local butchers. As was stated by the *Cincinnati Price Current*, in indorsing the stand of the *Chicago Journal:*

> The convention sought to turn back the wheels of enterprise and progress. If a convention of old time sickle manufacturers should be held to protest against the manufacture of reaping machines that would resemble that of the butchers, who are trying to "down" the dressed beef industry. The shipment of dressed beef from the west to the east is one of the improvements which has blessed the people of this age. It will live in spite of protests and of strikers and boycotts and conspirators of all classes.[17]

[17] *Cincinnati Price Current* (June 3, 1886), Vol. XLIII, No. 22.

Struggle at Akron Typical

As an example of a situation which was widespread, the case of Akron, Ohio, may be considered in detail. Thirty miles south of Cleveland, it had in the middle eighties a population of 30,000, mostly factory operatives. In 1887 the workers organized into 22 labor organizations which centered in one labor congress—the Trades and Labor Assembly. This assembly, in alliance with the local butchers, passed a resolution to patronize no butcher in the city, who after due notice persisted in buying meat from Armour and Company of Chicago. Armour prepared to open meat markets and the fight was on. Meat was selling normally at 6½ to 7 cents a pound. Two retail markets which were opened by Armour sold at 3 to 12½ cents per pound. The best meats were to be had, and crowds patronized the shops, while the 60 butchers were doing nothing. The people of the city were opposed to their local butchers. The fight was over in a week, and the Butchers' Protective Association of Akron agreed that its members would buy dressed beef from Armour and Company, in consideration of which action Armour and Company agreed to close the retail markets.[18]

In this fight against the Armour dressed beef innovation the Akron butchers appealed to the farmers to back them, on the ground that the triumph of dressed beef would greatly injure the home producers. The Summit County Pomona Grange at its session discussed the matter under the proposition "In their contest with Armour are the Akron butchers entitled to the sympathy of the meat producers, and meat consumers of the country?" It was clearly shown that the Akron butchers had a combination to keep the price down to the lowest point, the agreement being to buy where they could secure the lowest price, even of Armour and Company themselves. This drove the meat producers of the county to other

[18] See Reports of 1st Sess., 51st Con. (1889–1890), Vol. III, No. 829, p. 145. (Vest Report.)

markets, and they cleared a large percentage by going to Cleveland, where the Armour dressed meats were sold openly. Akron butchers, while buying at the lowest figures, were retailing meats at exorbitant prices, and hence no advantage was secured by consumers. The farmers decided they could not lend their sympathies to the butchers.[19]

Yet it must be realized that many of the butchers were perfectly sincere in thinking dressed beef a less desirable article. The first shipments were often frozen as hard as a rock and had to be thawed out.

Legislative Methods Against Dressed Beef

Finding even national associations unable to cope with the extension of dressed beef, the butchers turned to legislative methods. As a result of their efforts, together with those of the livestock producers and railroads, there were introduced into the legislatures of Pennsylvania, Vermont, Ohio, Kansas, Missouri, Colorado, and other states, various bills whose object was to prevent the sale in those states of the dressed beef shipped from outside each state. They declared that all meat intended for sale over the block, must be passed upon before slaughter by the inspectors of the particular state. In some states these bills became laws, especially in those states where farmers' representatives were present in large numbers in the legislature, but in some states, as, for example, Vermont, the bills were lost in committee when the facts were presented.

For it was demonstrated that the marketing of cattle in the shape of dressed beef had several advantages, which had enabled the business to grow to great proportions, and to which cattle growers and butchers would sooner or later have to conform. The cattle could be slaughtered in a wholesale way, every particle of offal utilized, meat sent to market cheaper, and as a rule, in as good if not better condition than on foot, with less shrinkage and a better distribution of the different

[19] *Breeders' Gazette* (June 9, 1887), Vol. XI, No. 23.

parts of the carcass where they met the readiest sale. These were substantial advantages, which reduced the cost between producer and consumer and contributed to the benefit of both. It was to the advantage of the cattle grower that the consumer should be able to buy his beef at as slight an advance as possible over the price which the farmer received.

Chicago Board of Trade Favored Dressed Beef

The situation became so menacing through the passage of several laws that the directors of the Chicago Board of Trade adopted the following preamble and resolution:

> WHEREAS: Bills have been introduced into legislatures of Pennsylvania, Ohio, Kansas and Colorado, and other states; and
>
> WHEREAS: Said bills are all designed to exclude from sale in such states dressed beef, hogs, sheep, green hams, shoulders, bellies, etc., and
>
> WHEREAS: The success of these bills in the state followed by others would irretrievably embarrass and ruin the dressed beef industry; be it
>
> RESOLVED: That we take pride in the industry, energy and economy of our citizens who have built up in a few years a trade in dressed beef, hog, and kindred products, of remarkable magnitude, expending millions of dollars here annually for labor and materials, and also in the fact that their enterprise has greatly cheapened the price of beef to the whole country; and
>
> RESOLVED: That we earnestly protest against any spread of legislation of this kind levelled against a manufactured product of this state, as being unwarranted and without precedent, and calculated to provoke retaliation; and
>
> RESOLVED: That from the testimony of our city and State Boards of Health and also from the recently published and convincing statement of *Elmer Washburn*, Supt. of Union Stock Yards, Chicago, we believe in no place in the United States is such care and vigilance exercised in inspection of cattle before and after slaughter.
>
> RESOLVED: That the pretense that dressed meats are diseased, advanced by adherents of these bills, is a sham: that the sole purpose and design is to cripple and impair one of the great industrial enterprises of the country, and the false

charges made by the supporters of such legislation will injure the reputation of our meat products at home and abroad and damage the cattle raising industry of the entire country.

RESOLVED: That a copy of these resolutions be sent to every member of the legislatures before which bills are or may be pending.[20]

Similar resolutions were adopted by the Live Stock Exchange. In these it was declared that the laws against the dressed beef traffic were unconstitutional.

State Laws vs. Dressed Beef Set Aside

The matter of the constitutionality of the state laws was decided in a case in Minnesota, where a Duluth local manager was arrested, tried, and fined $50 for offering for sale dressed beef from the Armour Packing Company of Kansas City. The case came before the district court, and Judges Ensign and Stearns united in their decision, of which the main points were:

1. Dressed beef is an article of general commerce.
2. Traffic in it as in other articles of commerce can only be regulated by Congress.
3. The Minnesota law was not constitutional and had no standing within the scope of the police regulation of the State from the fact that examination as to wholesomeness was not a feature of the case, notwithstanding the pretense that this law was enacted for the promotion of public health.

The case had another hearing before Judge Blodgett of the United States Circuit Court in Chicago, and the decision of the lower court was confirmed. Finally, the case was carried to the Supreme Court of the United States, which upheld the previous decisions that the Minnesota law was unconstitutional by its interference with interstate commerce.

Even after this victory for the dressed beef interests, the opposition took other forms. For example, in the legislature of Illinois was introduced a bill for state regulation of the stockyards.

[20] *Cincinnati Price Current* (Jan. 31, 1889), Vol. XLVI, No. 5.

Last Legislative Attempts

The cattlemen and butchers tried still another plan, originated, it seems, by Frank E. Gillett, a state senator of Kansas. As a result Governor Humphrey of Kansas proposed that a convention of members of legislative bodies of the states interested be held in St. Louis to consider the matter of uniform legislation in regard to the so-called "Beef and Pork Trust," each state to be represented by three senators and five representatives. The states invited to send representatives were Colorado, Texas, Nebraska, Ohio, Kansas, Wyoming, New Mexico, Arizona, Illinois, Missouri, Iowa, Indiana, Arkansas, Wisconsin, and Minnesota.[21]

The convention, consisting of 60 delegates from 9 states, met at St. Louis in March, 1889, and adopted the following resolutions:

> WHEREAS: It is commonly asserted and very generally accepted as true, that certain powerful trusts and combinations of corporations and individuals have united and combined for purposes of controlling the market price of cattle, pork, and other products of the country, and have entered into agreements and combinations with railroads for the purpose of centralizing the above named products in Chicago and other large western cities; and
>
> WHEREAS: All such combinations for purposes of centralizing markets and controlling or fixing the price of such production, is contrary to public policy and an injustice to producer and consumer, which should be prohibited by law, and,
>
> WHEREAS: As State laws are inadequate to wholly remedy evils complained of and believing national legislation is demanded to give complete protection to producers and consumers, therefore, be it
>
> RESOLVED: 1. That the Congress of the United States be respectfully requested to pass a law defining such combinations or trusts as unlawful and prohibiting them under adequate penalties, when interstate commerce is affected by such unlawful combinations or trusts.

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[21] *Cincinnati Price Current* (Feb. 14, 1889), Vol. XLVI, No. 7.

2. That the Interstate Commerce law for control of railroads be so amended that it will work in harmony with a law as above requested.

The Legislative Committee of this convention also submitted a form for uniform state legislation in regard to inspection before slaughter of cattle, sheep, and swine designed for slaughter for human food.

While the convention was without authority to enforce its wishes, it served to show the sentiment among producers and butchers regarding the increasing popularity of the dressed beef trade, and had a good deal to do with the appointment of a committee of the United States Senate to "examine fully all questions touching the meat products of the United States; and especially as to the transportation of beef and beef cattle and the sale of same," and in general to investigate the "Beef Trust" and its alleged relation to depressed prices of livestock.[22]

Dressed Beef Won on Merit

At this point it is sufficient to take up the statement that the dressed beef trade was built up through unjust depression of prices. The subject was well considered in an article in the *Breeders' Gazette* in 1888.[23] The price of livestock had declined, but the *Gazette* held that it was not reasonable, as the butchers' associations declared, that the price to the consumers had been kept at the old rates. The reverse was really the case. With the low price of cattle which had prevailed for some time, and of which all buyers could take equal advantage, it was pointed out that the condition of the butchering interests would be a most prosperous one if only the old rates to consumers still prevailed, but it was clear in 1888 that the

[22] Senate Reports, 51st Cong., 1st Session, Report No. 829. The position taken by the range cattlemen is interesting, especially because based on a wrong premise. The matter was the subject of an article in the *Breeders' Gazette* (June 2, 1887), Vol. XI, No. 22.

[23] "The Dressed Beef Industry as a Factor in the Present Situation," *Breeders' Gazette* (June 6, 1888), Vol. XIII, No. 23.

butcher trade was in a bad way, and that their business in many centers had been largely won by the dressed beef men. This was possible, because the latter could undersell the butchers, and, therefore, could command the trade of the public.

This leads to a clearer conception of the nature and causes of the depression in the late eighties which stamped the cattle markets throughout the country. The cause of the difficulty lay, not so much in the nature of combination, but very largely in an unusual competition, different from that which the market had previously known. Under the old system the butchers enjoyed a large measure of profit, which they appeared in no wise anxious to abridge by reducing the prices of meats to consumers, and any competition between them was purely local in its operations and temporary in its duration, while they were so numerous and their needs so imperative that the competition between them in the principal cattle markets had a tendency to steady and sustain values. All the tendencies and influences surrounding the market were then in favor of the producers.

With the growth of the dressed beef trade, however, all this was changed. The large margin of profits of the local butchers presented an opportunity for this trade to gain a foothold, for those engaged in it were doing business on a larger scale than the butchers, and did not need such wide margins to render their business profitable. During the transition from local slaughtering to the final victory of dressed beef in the markets of the country, the market suffered from the competing interests of middlemen, which were adverse to those of the producers. The whole tendency of the struggle lay in the direction of lower prices to the consumer, for it was to the interest of both butcher and the dressed beef men to cheapen beef to consumers to the last degree in order to extend their trade.

Nature Brought Victory to Dressed Beef

At the very time that the fight against dressed beef was at the climax of intensity, a natural phenomenon did much to give it the victory. That was the failure of the ice crop in the winter of 1889 and 1890. A great many butchers the country over, who had stood out against Chicago dressed beef up to that year, then began to experiment fairly with it. They found it too great an expense to handle meats of their own slaughter and hence a marked increase was seen in the total dressed beef trade.[24]

Finally by 1894 one notes the complete triumph of dressed beef. It is true the ninth session of the Butchers' National Protective Association was held in that year, but there were only 65 delegates, a meager representation of some 100,000 butchers in the United States.[25] On the other hand, however, the *Butchers' Advocate,* which had started in New York City some years before to fight dressed beef, declared frankly in its issue of November 21, 1894, that:

> Western dressed beef has completely captured New England. The most expert and experienced butchers concede it is an impossibility to kill native steers and compete in price with the imported article. When the fact is shown the observer by careful mathematical computations he begins to appreciate the commercial genius of the men who can kill cattle in far western points, lay the carcass down at the most remote New England crossroads and sell at prices lower than the bare cost of raising and killing the native animal.[26]

[24] *Cincinnati Price Current* (June 26, 2890), Vol. LXVII, No. 26. See also *Breeders' Gazette* (1889), Vol. XVI, No. 1, article by John Clay.
[25] *The National Provisioner* (June 16, 1894), Vol. IX, No. 24.
[26] *Butchers' Advocate* (Nov. 21, 1894). Vol. XVIII, No. 1.

CHAPTER XII

PRESENT ASPECTS OF AMERICAN BEEF TRADE[1]

United States Greatest Beef Producer

As a producer of beef, the United States leads the world. The census of January 1, 1920, reported 66,652,559 cattle, of which 35,424,458 were beef animals. These exceeded the nearest competitive beef country by 44 per cent. For the present the relative figures on cattle, including milk and draft animals as well as beef, were given as follows by the United States Department of Agriculture:

Countries	Number Cattle
India	142,567,000
United States	66,653,000
Brazil	37,500,000
Argentina	27,392,000
Germany	16,904,000
France	12,374,000
Australia	11,040,000
Canada	9,477,000
Uruguay	7,803,000

Not all these countries are meat-surplus countries, however, as many of them consume more than they produce. The eight principal meat export countries are Argentina, the United States, Australia, Uruguay, New Zealand, Brazil, Canada, and the Union of South Africa.

Cattle also are the only class of livestock that has gained in numbers as compared with pre-war conditions. The International Institute of Agriculture reports a general increase of about 19,000,000 head in the world as a whole, as compared

[1] Based upon an article by H. V. Munnecke, "Trends in the American Beef Trade," *The Producer*, July, 1922.

with a decrease of 27,700,000 sheep and 3,000,000 swine. Certainly these figures would not provide a foundation for the oft-repeated prediction of a world shortage of beef. It may be said, however, that the statement above made is open to doubt. Although no exact figures are available for the world as a whole, the countries from which we have reliable recent statistics show a decrease of approximately 7,000,000 head in the total number of cattle as compared with pre-war conditions, of 97,000,000 sheep, and of 19,000,000 swine.

Beef Exports Diminishing

Nevertheless, the general beef trade has changed considerably in this period. During the war the laboring classes in many countries gradually changed their standards of living to a higher level, with a resulting increase in the demands for animal products. To offset this, the widespread unemployment tends to decrease consumption and to limit foreign trade. The war raised to unprecedented levels the imports of beef products by the Allies, but current statistics show a strong tendency for these imports to recede to a point not much above that of the pre-war period. Thus the United Kingdom imported 1,362,693,584 pounds of beef in 1921, as compared with 1,108,921,184 pounds in 1913. Similarly, France increased her beef imports from 5,165,228 pounds in 1913 to 294,944,661 pounds in 1920, but for 1921 her beef imports dropped to something over 120,000,000 pounds. Italy's experience has been much the same as that of France, while Germany's beef imports in late 1921 were only about a third of those at the corresponding time in 1913.

In 1920 American exports of beef were nearly four times as large as in 1913, but in 1921 they had almost returned to the pre-war level. During the 5 years, 1910–1914, the average exports of beef from the United States totaled 80,000,000 pounds, while during the 5 years, 1915–1919, the average exports were 421,000,000 pounds—an increase of approxi-

mately 526 per cent. In the last 15 years, according to the Department of Agriculture, we have exported the following percentages of our annual beef crop:

Year	Per Cent	Year	Per Cent	Year	Per Cent
1907	4.80	1912	0.86	1917	5.62
1908	3.41	1913	0.79	1918	9.53
1909	2.03	1914	1.68	1919	4.78
1910	1.50	1915	6.86	1920	2.68
1911	1.30	1916	4.69	1921	2.49

Our competing nations in the export trade have had a varied experience. Argentina shows practically no change between 1913 and 1920, while Canada shows a very distinct increase in 1921 over 1914. New Zealand exported nearly double the amount of beef in 1920 that she did in 1913, but much of this consisted of frozen beef accumulated during the war rather than new product. Australia showed decreases for both 1920 and 1921 as compared with 1913.

Per Capita Consumption Declining

Recent figures on the average consumption of beef by different countries are not available. The pre-war per capita consumption of Great Britain for 17 years ranged from 55 to 60 pounds, although in 1920 it had dropped to 25.8 pounds. Canadian pre-war consumption for 10 years ranged from 54 to 61 pounds, while that of Germany ranged from 39 to 45 pounds over a period of equal length. France averaged about 43 pounds in 1904, but her consumption of beef has most certainly decreased since that time. In 1920, Belgian beef consumption totaled 29.5 pounds per capita, while Spanish consumption was only 2.3 pounds. The big meat producing countries are heavy consumers. For example, the consumption of beef in Buenos Aires varied on a per capita basis from 275 pounds in 1911 to 163 pounds in 1916.

American per capita consumption of beef is constantly decreasing. Since federal inspection of slaughter of meats

destined for interstate trade was inaugurated, the per capita consumption of beef has dropped from 79.7 pounds in 1907 to 57.7 pounds in 1921. Accurate figures are not available previous to 1907, but in 1900 the estimated consumption of beef, based on the census, was 79.2 pounds. By using the number of beef cattle per capita back to 1840, as a basis for estimate in relation to recent consumption, the average annual per capita consumption of beef by decades was probably:

Decade	Estimated Consumption (Lbs.)
1830–1839	75.7
1840–1849	79.7
1850–1859	85.6
1860–1869	73.7
1870–1879	77.8
1880–1889	87.2
1890–1899	88.3
1900–1909	76.1
1910–1919	64.3
1920–1921	57.1

The actual difference in consumption is probably not so great as the figures indicate, since the wastes of beef were much greater previous to 1900. This was due in part to the less perfected state of refrigeration and the handling of meats in the earlier years, as well as to the unusual nature of the cattle slaughtered and the larger amount of trimming required for the different cuts.

Marked Increase of Milk Cattle

Further evidence of this condition lies in the fact that beef consumption through these years has varied less than per capita population of beef cattle. Part of this variation in per capita population of beef cattle has resulted from the differing times of the year when the census was taken, but this does not account for all the difference between beef consumption and per capita beef population. The figures for the respective censuses follow:

Year	All Cattle	Milk Cattle	Other Cattle
1840	0.863	.....	.....
1850	.765	0.275	0.490
1860	.894	.344	.550
1870	.717	.287	.430
1880	.718	.248	.470
1890	.829	.264	.565
1900	.887	.225	.662
1910	.673	.224	.449
1920	.632	.296	.336

Several interesting facts develop in this table. The decrease of the strictly beef cattle ("other cattle") with reference to our population is marked, while the per capita increase of milk cattle shows most definitely during the last decade.

This increase of milk cattle has had a very marked effect on the quality of beef coming to the market. For example, at the markets of Chicago, Milwaukee, and St. Paul approximately 50 per cent of the receipts are animals with dairy characteristics. At Chicago this proportion is not quite equaled, but at Milwaukee and St. Paul it is exceeded. Including all markets, the proportion of cattle of dairy blood probably runs around 30 per cent. Dairy cattle, of course, do not provide a high grade of meat; but the development of the small retail shop in connection with groceries has afforded an outlet for this class of cattle, which has helped the dairy industry, although some hold it has proved extremely detrimental to the production and sale of quality beef.

Relative Rank of Markets

The relative rank of the different markets for 1921 in receipts and slaughter of cattle and calves is shown in the following table:

Market	Receipts	Slaughter	Per Cent Slaughtered	Shipments
Chicago	3,539,538	2,236,776	63.2	1,302,762
Kansas City	2,469,442	1,199,692	48.5	1,260,750
Omaha	1,434,576	797,419	55.5	637,157
St. Louis	1,077,260	465,875	43.2	611,385

Market	Receipts	Slaughter	Per Cent Slaughtered	Shipments
St. Paul	984,826	563,635	57.2	421,191
Fort Worth	983,802	576,203	58.5	407,599
Jersey City	843,928	842,754	99.8	1,174
Pittsburgh	745,100	174,725	23.4	570,375
Sioux City	620,373	273,382	44.1	346,991
Buffalo	609,063	166,679	27.3	442,384
St. Joseph	558,040	369,883	66.2	188,157
Indianapolis	483,097	230,000	47.6	253,097
Denver	481,502	121,984	25.3	359,518
Cincinnati	453,974	301,620	66.4	152,354
Milwaukee	438,720	402,492	91.7	36,228
Oklahoma City	315,113	202,352	64.2	112,761
New York	301,398	299,697	99.4	1,701
Wichita	284,815	83,035	29.2	201,780
Baltimore	279,333	155,643	55.7	123,690
Cleveland	247,835	227,596	91.8	20,242
Louisville	246,003	81,036	33.0	164,967
Philadelphia	227,035	224,731	99.0	2,304
Lancaster	205,297	37,267	18.2	168,030
Detroit	200,644	168,448	83.9	32,196
New Orleans	187,899	159,600	84.9	28,299
El Paso	170,410	23,709	13.9	146,701
San Antonio	151,050	35,846	23.1	115,204
Portland	119,911	59,056	49.3	60,855
Amarillo	113,239	983	0.9	112,256

It is interesting to note in the foregoing table that such markets as Jersey City, New York, Philadelphia, Cleveland, Milwaukee, Detroit, and New Orleans are essentially terminals at which over 80 per cent of the cattle and calves received are slaughtered. On the other hand, Amarillo, El Paso, and Lancaster are essentially points for reshipment—in the latter case for slaughter elsewhere, and in the two former cases for further feeding and development. The great majority of markets occupy intermediate positions, although, in general, each section of the country is characteristic. For example, the two markets of the central region, not included as terminal markets in the foregoing—Chicago and Indianapolis—average slaughtering 61.3 per cent of their receipts. The markets of the Northwest—Omaha, St. Paul, Sioux City, Portland, Den-

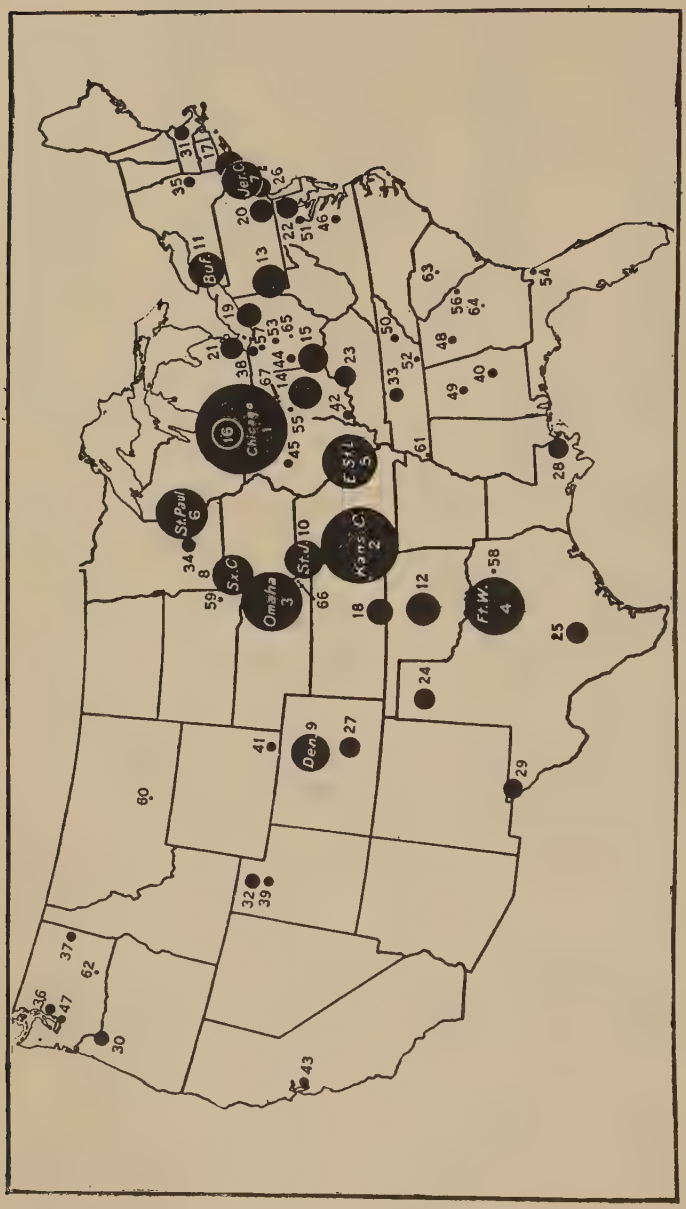

Figure 14. Cattle Markets

Relative size based on average yearly receipts of cattle and calves, 1916–1920. Area of dot varies with number received

ver, and St. Joseph—average slaughtering 49.7 per cent of their receipts. The three markets of the Southeast—St. Louis, Louisville, and Cincinnati—average slaughtering 47.7 per cent of their receipts. The seven markets of the Southwest—Kansas City, Fort Worth, Oklahoma City, Wichita, El Paso, San Antonio, and Amarillo—average slaughtering 47.2 per cent of their receipts; while the four big markets of the East—Pittsburgh, Buffalo, Baltimore, and Lancaster—average slaughtering only 28.1 per cent of their receipts, and really act as forwarding stations for the big terminal markets of the East already listed.

Classification of Cattle

Cattle for immediate slaughter are divided into the two general classes of beef cattle and butcher stock, while cattle to go back to the country are divided into feeders and stockers. Beef cattle comprise beef steers, both native and range, yearling steers, yearling heifers, and heavy heifers. Butcher stock, on the other hand, is composed of cows, bulls, and veal calves. The rate at which these classes of cattle come to market varies with the season of the year. For example, the cattle from the northwest states arrive on the market from the end of July until the end of December; the cattle from the southwest range and from the bluegrass sections begin to run about mid-April and last until July; the cattle from the beet pulp, cottonseed cake, and hull-feeding districts move about a month in advance of these latter cattle; while the eastern-fed cattle (Pennsylvania, West Virginia, and Maryland) move about a month previous to these. The short-fed cattle from the Corn Belt come from the first of November on, while the principal feedlot run begins about the last of the year and continues until well into June.

Based on the use to which the different classes of cattle are put, one finds thoroughly marked differentials in price. As

possibly most typical of these conditions stands the Chicago market, on which the prices by years ran as follows:

Year	Native Beef	Fat Cows and Heifers	Canners and Cutters	Veal Calves	Range Cattle	Stockers and Feeders
1910	$ 6.80	$ 4.60	$3.10	$ 8.10	$ 5.40	$ 4.85
1911	6.40	4.35	2.85	7.60	5.65	4.75
1912	7.75	5.25	3.40	8.75	7.60	5.70
1913	8.25	6.10	4.25	10.10	7.40	7.05
1914	8.65	6.55	4.60	9.90	7.65	7.35
1915	8.40	6.10	4.25	10.15	7.75	....
1916	9.50	6.75	4.80	10.85	8.40	7.20
1917	11.60	8.25	6.25	13.75	10.60	8.40
1918	14.65	9.50	7.25	15.75	14.50	10.95
1919	15.50	10.00	6.45	17.05	11.25	10.85
1920	13.30	8.55	5.05	14.90	8.80	8.95
1921	8.20	5.40	2.90	9.80	6.15	6.45
Average.	$9.92	$6.78	$4.60	$11.39	$8.43	$7.50

Value of Native Beef

It is popularly believed that the margin between good native beef and butcher stock, or cutters and canners, is constantly narrowing. On the basis of the foregoing statistics this is doubtful, since the following ratios between canners and cutters and native beef, and between fat cows and heifers and native beef, show that the relative value of native beef is actually above that of a dozen years ago:

	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
Ratio cutters and canners to natives	2.19	2.24	2.27	1.94	1.83	1.97	1.97	1.85	2.02	2.41	2.63	2.82
Ratio fat cows and heifers to natives	1.47	1.47	1.47	1.35	1.32	1.37	1.41	1.41	1.54	1.55	1.55	1.51

The consuming public has changed its tastes for beef during the development of the beef industry. Today the popular-sized steak is 2 pounds or less, while the 3- to 5-pound roast measures the average family demand. A high proportion of red meat, and smaller cuts, are the two dominant problems that

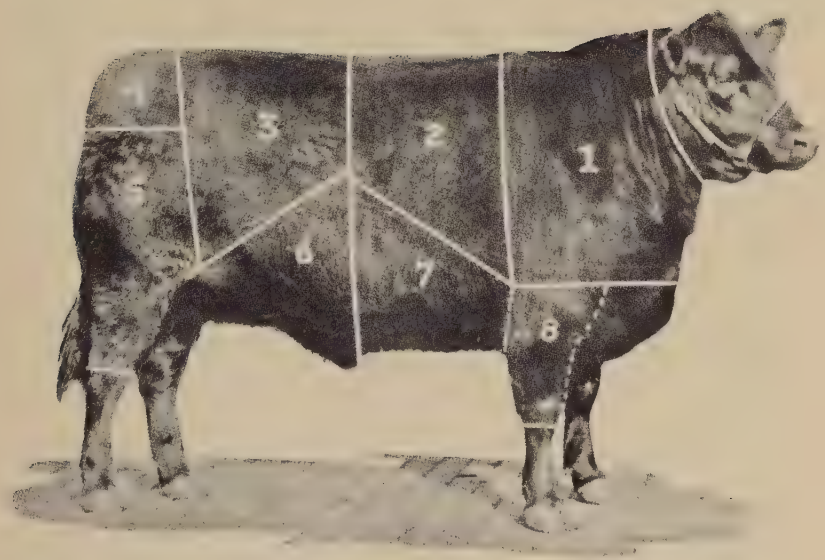

Figure 15. Beef Steer Showing Cuts

1. Chuck
2. Rib
3. Loin
4. Rump
5. Round
6. Flank
7. Plate
8. Fore Shank

today confront the meat retailer. Quality of beef is a predominating factor, and, although there is some recession from the extreme demands for high-priced cuts that followed the war, the trade in ribs and loins still continues to control prices and trends in the entire industry.

Gradation of Carcasses

Carcasses of beef are usually graded as choice, good, medium to good, fair to medium, fair, and plain. The relative proportion of these different grades on the market varies according to the season of the year. During the season in which the receipts are predominantly native cattle—January 1 to July 15—good and choice carcasses total about 10 per cent; medium and medium-to-good carcasses, about 70 per cent; fair-to-medium and fair carcasses, about 15 per cent; and plain carcasses, about 5 per cent. On the other hand, during the season in which the receipts are predominantly grass cattle—July 15 to January 1—the percentage of good carcasses runs about 30; of medium and medium-to-good, 40; of fair-to-medium and fair, 15; and of plain, 5. The grades in the two cases are not exactly equivalent, as good westerns are not equal to medium natives.

In addition to being graded for quality, the carcasses are graded by weight and sex. About 14 per cent of all cattle marketed are cutter and canner cows, while about 40 per cent of the cattle suitable for carcass beef are she-stock. In the steer beef about 40 per cent of the carcasses run over 600 pounds and about 60 per cent under. The demand for the heavier carcasses varies little throughout the year. The markets of the big cities supply the principal trade for them, the sales being largely to hotels, restaurants, dining cars, and clubs that have a standard demand for certain cuts the year round. This natural demand for heavy carcasses takes only about 15 per cent of all the shipper cattle on the market, their live weight being 1,300 pounds and up, and their carcasses making about

750 pounds of beef and up. It is difficult to secure this class of cattle at all seasons of the year, as very few of them come to market between August 1 and February 1, except those furnished for shows and the Christmas trade. From February forward there is usually a sufficiency of this class of cattle, while in late March and April the market may be overcrowded, with a consequent drop in price. On the other hand, in times of scarcity of heavy cattle, buyers having orders for this class of stock make competition so lively that they often bring $1 to $2 above their real value as compared with smaller animals of the same grade. It is this class of cattle that has been most provocative of criticism on the part of producers, since a judgment of values based on their prices in times of either scarcity or surplus is certain to mislead the average feeder.

Variations in Requirements

Very few cars of straight lots as bought on the hoof can be sold. Most cars of dressed beef must be made up of assorted lots based on quality, weights, cost, and suitability to the general trade of the region in which the carcasses are to be marketed. Usually 4 or 5 choice carcasses, 5 to 8 medium carcasses, 5 to 8 fair-to-medium carcasses, and 2 to 5 plain carcasses make up an assortment for refrigerator shipment.

The beef requirements of the markets in the different sections of the country vary considerably. The beef trade is largely based upon New York. New York, Jersey City, and the adjacent regions take all grades and classes of beef. The down-town houses of New York City handle a varied assortment, mostly weighty, for the large shops and the hotel and restaurant supply trade. These houses handle almost everything except yearlings. On the other hand, the Hudson River territory to the north of New York demands a greater proportion of medium-to-choice carcasses with lighter weights, while Long Island and the Harlem section of the city constantly demand the best light carcasses available. Up-state

New York and most of Pennsylvania, excepting Philadelphia use the fair-to-medium grades of beef with lighter average weights, as do Delaware and most of New Jersey. Philadelphia takes a general assortment like New York, demanding all grades from plain to choice, but price levels at this market are frequently lower than at New York, except on the good-to-choice carcasses.

New England Demands Heavy Beef

Boston is the market for heavy beef. The carcasses must be strong and well finished, steer beef running from 800 pounds up and cow beef from 600 pounds up. However, for the trade in the surrounding towns and country, Boston affords a good outlet for strictly choice 900-pound live cattle. Boston is really the hub for the entire New England beef trade, although the southern sections of New England vary from the northern and western ones in demanding lighter sides.

Demands Further South

Washington calls for a general assortment of lighter weights, mostly yearlings and heifers in the medium-to-good grades and weighing 400 to 600 pounds. It is a poor market for plain-to-inferior beef, especially grass stock. On the other hand, Baltimore, and Maryland in general, take the fair-to-medium grades in 85 per cent of their shipments, but average rather lower price levels than the districts farther north. Baltimore handles, however, about 15 per cent of good yearlings, with carcasses weighing 500 to 600 pounds.

South of the Potomac and Ohio rivers, and east of the Mississippi, will be found the big market for the southwest range cattle. In certain regions, such as a few of the larger cities and the winter resorts, the demand is increasing for the better cattle from the feed-lots of the North, but up to the present time this demand is rather spotty from a geographical standpoint.

Mid-West Inclines to Lighter Weights

The Mid-West, composed of the east and west North Central states, consumes largely the fair-to-medium grades, with more fed cattle than are included in the Southeast, the Southwest, or the plains and Mountain states. The most desired carcasses for this section weigh from 400 to 600 pounds, but should not be overly fat. The principal cities of this section—Chicago, Milwaukee, St. Louis, Kansas City, and Omaha—with their adjacent selling territories, are relatively uniform in their demands. All classes of beef are sold here, but principally light butcher cattle. These are usually yearling heifers and steers, which go to the shop trade largely, and are medium to choice in quality. The Twin Cities—Minneapolis and St. Paul—are very interesting, due to the difference in their demands despite their proximity. Minneapolis seeks more fed cattle than St. Paul and maintains a better price level. Minneapolis cattle should weigh from 300 to 600 pounds in the carcass, while St. Paul cattle weigh 500 to 700 pounds.

The Far West and Texas

In the West and Northwest the bulk of beef sold comes from grass cattle. There are a few fed cattle in this section and an increasing number of pulp cattle. In general, the consumer's needs in this section are adjusted to supplies from Denver, or a trade parallel to this. On the Pacific Coast the medium grades of cattle also predominate. They are mostly grass-finished and weigh from 600 to 800 pounds on the block.

The Southwest in its general character resembles the mountain and plains region, as far as country trade is concerned. A few of the cities, however—such as Houston, Dallas, Fort Worth, and El Paso—are developing a growing demand for the best choice light-weight yearlings, and each year some of the best show cattle from the International Live-Stock Exposition at Chicago and other winter shows find ready sale at these points.

Kosher Trade an Important Factor

A discussion of beef demand would not be complete without a reference to the Kosher trade. In New York this trade takes the best heavy cattle and the best of the light choice cattle. The greatest percentage of these cattle are steers, although some fat cows and heifers are included. In Chicago the Kosher trade furnishes the best outlet available for heavy steers and cows, all of the cattle being prime in finish and weighty in carcass. Only the forequarters of these cattle go into the Kosher trade, however, and the ribs and loins are cut out to supply the dealers in the hotel, restaurant, and club trade.

Consumption of Beef and Veal

The distinctions in the consumption of beef and veal between different sections of the country are presented by the Department of Agriculture in the "Yearbook" for 1920. The essential facts are presented in the following table:

Section	Beef Consumption				Veal Consumption			
	Urban	% Diet	Rural	% Diet	Urban	% Diet	Rural	% Diet
North Atlantic.....	64.0	38.4	47.1	26.8	13.5	8.09	10.7	3.67
East North Central.....	75.6	42.8	48.3	24.6	11.6	6.56	7.2	2.96
West North Central....	77.5	42.8	57.4	26.9	11.7	6.43	6.3	1.85
South Atlantic.....	55.1	34.8	28.5	16.5	5.7	3.59	3.2	0.93
South Central.....	66.1	37.1	28.6	15.7	4.4	2.47	1.7	6.74
Western...	76.2	42.8	64.7	34.4	16.3	9.17	12.7	6.01

The most interesting fact brought out by the above table is that the rural consumption of beef and veal is invariably smaller, both actually and proportionally, than the urban consumption, while the greatest beef consumption occurs in the west North Central and Western states, with the greatest veal consumption in the North Atlantic and Western states.

Demand for Fed Beef Growing

One interesting factor in the modern beef trade is found in the gradually growing demand for fed beef. It is becoming increasingly difficult to market plain or inferior beef, the distinction between today's market and the market of even a

year ago being quite marked. Consumers are willing to pay several dollars per hundredweight more for the carcasses from finished animals than for grass animals. In New York, about June 10, 1922, carcasses from native beef were selling freely at 14 to 16 cents a pound wholesale, while good Texas grass beef was actually begging at 8½ cents. This condition is not extreme, but really measures the trend of modern markets.

The greatest quantity of beef is marketed in the fresh form, although nearly 10 per cent by weight is marketed in the semipermanent forms of frozen beef, cured beef, or canned beef. Roughly speaking, about 3 per cent each is frozen or cured, and about 4 per cent is canned. The American people, as a whole, will not buy frozen carcasses, and most of the meat which is frozen is put in that form temporarily for later manufacture into sausage. However, certain cuts, such as tenderloins and strip loins, are frozen for sale to the hotel and restaurant trade, as are the loins and ribs of prime cattle whenever they come on the market in surplus amounts. Boneless chucks and beef trimmings are frozen for sausage manufacture. Frozen imported beef is confined in its distribution to New York and its adjacent territory. The bulk of this frozen beef goes to ship chandlers and jobbers, and very little goes direct to the consuming trade. As a matter of fact, there is never very much imported frozen beef sold, in terms of the general trade. The livestock for the preparation of cured and canned beef, of course, is found in the cutter and canner grades on the market. It is usually she-stock, although occasionally thin steers of inferior breeding, which are definitely unsuited for the feed-lot, are used for these purposes. The bulk of animals going into this trade are dairy cows.

Veal Calf Popular

The veal trade is based on two general classes of calves: the milk veals, which come from the dairy districts, and the heavy veals, which come off the southwest range, and from the

Corn Belt at certain seasons of the year. During the period from January 1 to June 1 from 80 to 90 per cent of the calves received are true milk veals, but from June on the percentage of heavy calves begins to increase, so that during late September, October, and early November there are large receipts of heavy, common calves. The carcasses of milk veals are usually divided into three grades, which for convenience may be called good to choice, medium, and common. The good-to-choice veals comprise from 10 to 15 per cent of the receipts, the medium veals from 45 to 50 per cent, and the common veals from 35 to 40 per cent. The heavy veals are divided into two grades—those of medium to good and those of common to medium. Each of these grades is again subdivided by weights. For example, the medium-to-good heavy veals are grouped, on the basis of their carcasses, from 90 to 120 pounds, 120 to 140 pounds, 140 to 175 pounds, 175 to 200 pounds, 200 to 250 pounds, and 250 pounds up. Obviously, in the last class the question as to whether an animal is veal or young beef is determined largely by the particular buyer making the purchase and the department handling the animal. The border line here requires arbitrary decisions where arbitrary differences do not exist. The common-to-medium heavy veals are divided into two weights—under and over 120 pounds.

Veal Markets

The milk veals are largely sold in the territory north of the Ohio River and east of the Mississippi. The heavy veals, on the other hand, are largely consumed in the remaining territory. While the South is not a large veal market, certain sections, such as New Orleans, do a thriving business at fairly good price levels. Most of the veals on this market, however, are of the heavier types.

In certain sections the problem is not the heavy veal, however, but rather the immature veal. Certain cities of the East, like New York, have laws specifying the minimum weight of

veal carcasses—e.g., 60 pounds; but in other cities a certain proportion of bob veal and calves under a week reaches the market.

Regions in which there are large foreign settlements usually provide good veal markets. For example, the Jews and the Slavic races, especially the Poles, consume relatively large quantities of veal. The Montana and Colorado mining districts develop strong seasonal demands for veal of medium weight, as do certain of the industrial districts of the Northeast where labor congregates largely by nationalities.

Distribution an Intricate Problem

Successful marketing both of beef and of veal is dependent on a knowledge of the trade demands of each of the different sections of the country, and the selling of each class and grade of beef at the point where it can realize the best price. It frequently happens that steers from the same car-lot purchased on the Chicago market are sold in different states, and realize differences in price as great as $2 to $4 per hundredweight, despite the fact that the carcasses are of the same grade. The distributor attempts, of course, to place his carcasses at the point where the most money will be realized, but it often happens that his supplies would overload his best markets and his surplus must be vended at lower prices. On this account, the price level for cattle of this grade will be lower than if all carcasses could reach the top market. But a distributor is at the same disadvantage if he does not know the characteristics of each regional market, since he cannot pay the prices for cattle which his competitor who knows the markets does, and his business is consequently restricted. It is because of their acquaintance with, and ability to supply, these regional demands that certain firms in the packing industry have developed nation-wide businesses instead of local businesses, because such companies as can reach understandingly these better markets can provide better prices for the producer and build greater volumes of trade.

CHAPTER XIII

GROWTH OF AMERICAN MEAT TRADE ABROAD

Early Meat Exports

The evolution of meat exports was slow from the time of the organization of the United States to the middle seventies. Salted meats, tallow, lard, and other pork products already noted were the only exports known for many decades. For example, an extensive trade in English meats had developed during 1861–1862 and a large proportion of the hogs packed in Chicago were cut for the London and the Liverpool markets. Cheap food had become the great problem with the dense population of Europe, and cheapness of pork products as compared with other meats and the ease and economy with which it could be handled and cured, brought it steadily into greater demand. From the block in a Chicago packinghouse 1,000 tons of sides and shoulders were taken, rubbed in salt, loaded upon the cars, and sent to the seaboard. Here, the product was packed away in the hold of a ship between layers of salt, occupying little room, costing nothing for packages, and by the time it reached Liverpool it was fully cured and ready for consumption. If not sent "loose," it was shipped in coarse, inexpensive wooden boxes in "dry salt." An equal quantity of beef would have required cooperage worth nearly $20,000, and a pound of beef would not go nearly as far towards sustaining the laborer who consumed the products.[1] For this reason it is obvious why the imports of such beef at Liverpool amounting to 35,087 tierces in 1866–1867, should be only 61,000 tierces in 1870–1871, and 41,000 in

[1] *National Livestock Journal* (Jan. 1874), Vol. V, No. 1.

1872–1873. On the other hand, three times as much barreled pork was exported in 1872–1873 as in 1866; seven times as much bacon, and three times as much lard. The trade had so increased that provision merchants in London carried in their regular stocks almost twice as much bacon as they imported during the whole year of 1866.

British Meat Needs

The increase in the export of live cattle on a commercial basis after the Civil War came at a time when the situation in the British Isles urgently demanded new supplies. This demand had a great effect on the development of the American meat industry. For a time British students of agriculture did not realize the situation, but the lack of adequate home supplies of meat was at last seen in 1894.

In that year, at a meeting of the International Health Exhibition, a study was made of the meat supplies of England, and the causes which had checked the development of the home production of meat and the means of securing supplies for largely populated centers. Statistics were presented indicating an absolute, as well as a relative, decrease in livestock. A hundred years before, Arthur Young had said England possessed 3,500,000 cattle, with a human population of only 7,000,000. At that time there was one head of cattle for every two people, but in 1883 there was only one head for every seven people. One of the causes for this decline had been the recurrence of outbreaks of contagious diseases among cattle. Another was the continuous downhill trend of values for mutton and wool which led to a great reduction in the flocks of sheep.[2]

The demand for meats had become so insistent that by 1870 it was seen that, while the available sources of supply were home and foreign, under each of which heads there were

[2] MacKenzie, K. J. J., Cattle and the Future of Beef Production in England, pp. 9–11.

two classes—live animals and dead or dressed meat—the home source was not to be counted upon for an increase, and the foreign supply must, therefore, be exploited. The home supply had been the mainstay of the English and Scotch farmer, and their strong support had been the profit gained from beef and mutton, but not being able to hold their own, numerous attempts began to be made to transport live American cattle across the Atlantic.

First Cattle Exports

The first exporter of live cattle from the United States to Great Britain seems to have been Nelson Morris, who shipped a few cattle to London and Glasgow in 1868.[3] The next shipment of livestock to England for butchering purposes was in July, 1873. On account of the many restrictions on the importation of cattle from the continent of Europe due to the "rinderpest" and other diseases and the high price of Scottish cattle, the firm of John Bell and Sons, Glasgow, Scotland, had experimented with shipments of live beef cattle from America. The first shipment of six head was made in July, 1873, and was so satisfactory that Henry Bell was sent to the United States to make a regular business of these shipments.[4] Twelve head were soon being shipped on each Anchor Line ship. The first shipments were made on the upper deck in open stalls and the cattle were placed in the care of one of the ship's stewards, although if larger shipments were made it was proposed to employ a special attendant. The cattle arrived in fair condition, losing not more than 50 pounds on an average during the voyage. The first lot of 12 shipped on the "California" was unfortunate on account of a severe storm off Nova Scotia. Four were washed overboard and the others were badly bruised. This showed the necessity of shipping cattle between decks, which required their hoisting. Illinois

[3] Nimmo Report (1885), p. 198.
[4] *Ibid.*, p. 172, letter of T. C. Eastman.

cattle were bought for shipment at an average cost of $100 per head, the cost of transportation being $75, making the cost in Glasgow $175, whereas Scotch cattle of the same grade sold for $190, giving the importers a profit of $15. At that time it was thought that the American shipments would not be permanent because German cattle, when quarantine restrictions were removed, could be sold in England for about $30.[5]

In October, 1876, William Colwell, a cattle dealer of Boston, shipped a cargo of 450 live cattle to Liverpool on the SS. "Istrian," via the Leyland Line.[6] He continued this business until about 1885, when financial conditions forced him to stop shipments. T. C. Eastman of New York was also a very heavy shipper of cattle to England and Scotland from 1877 to 1885, when he discontinued the business. Hathaway and Swift of Brighton, Massachusetts, also shipped live cattle to London, Liverpool, and Glasgow from Boston a year or two after William Colwell. There was, then, quite a live cattle export trade during the late seventies.

Prior to the winter of 1876 beef cattle had not been shipped in large numbers from the United States to foreign countries because of the expense, the risk incurred, and the monopoly of the European markets by east European stock raisers. Canada, however, had been exporting livestock to the mother country for some time with success, and after the experiments of shipments from the United States already mentioned, it was seen that special equipment was necessary. For one thing, it was essential to have constructed on vessels apartments quite different from anything heretofore in use. Portable stalls in which the cattle were fastened had to be specially made and arranged to give room for feeding and watering, and to be removable with the cattle in them, to different parts of the vessel. The stock was thus brought upon the deck for several hours each day and was given the benefit of the fresh sea

[5] Taylor, C. H., History Chicago Board of Trade, Vol. I, p. 493.
[6] Nimmo Report (1885), p. 197, letter of William Colwell, dated April 13, 1885.

air. This arrangement was of American invention and it was hoped that its introduction would open Europe as a market for the stock raisers of the United States.

Early Cattle Ship Conditions

Picturesque accounts have been written of the early American cattle ships of the eighties, but the truth would seem to be that, as far as the welfare of the livestock was concerned, it was but little better than the horrors of "the middle passage" in the old slave trading days. After the heyday of the shipping of live cattle from the United States a book on the subject appeared, in which were set forth the drawbacks of that system of supplying American meat to Europe. As a result of a careful investigation it was shown: first, that the live cattle trade compelled ship-owners, if they would carry enough to make it pay, to run great risks, for the cargo was bulky considering the weight; second, the cattle between decks were too crowded and suffered terribly in rough weather; third, that the cattle on the upper deck were put in a kind of cow-shed or a temporary shelter deck which in a storm was liable to be carried overboard, taking with it the livestock; fourth, that the insurance rules were opposed to humaneness of treatment of the animals; fifth, that the overloading was a grave danger to all men who were in charge of the cargo.

Present Conditions

By way of contrast to this situation is the following description from the *New England Magazine* of modern (1909) cattle ships:

> At Chicago the cattle are disposed of to one of the large shippers of cattle to be shipped by rail to some of the numerous ports of shipment. Those that are to be shipped from Boston were brought by rail to the Brighton stockyards where they were put into pens for a few days to stretch their legs and limber up after their long journey. On the morning they are to be shipped,

before the cattle leave the yards, they are driven through a chute in order to rope them, either by fastening the rope around their horns, or necks, if they are hornless.

They are taken by rail direct to the steamers either to Charlestown or East Boston. As the steamers are divided into sections for the cattle and it being known how many cattle each section will accommodate, only such a number are driven into the ship at a time as will fill any one section. These sections vary in size from those accommodating from four to twenty or more cattle. As the cattle enter the compartment assigned them men stationed for the purpose, catch hold of the ropes that are on their necks, draw the ends through holes in planks which serve as stanchions and tighten with two "half-hitches." The next day these knots are changed to what is called a "double loop" and the morning the cattle are landed the knots are changed again into an "overhang" loop or a "double bow." In either case these last knots are tied so that a man can run along a row of cattle and with one vigorous pull on each rope free them one by one. Every morning at 3:30, the men are called and at 4:00 they commence watering the cattle.

Throughout the ship on each deck occupied by the cattle are water pipes running overhead through the passage ways and at certain intervals are short pieces of hose by which the small moveable tanks are filled with water. The duty of one man is to keep these tanks filled, dip out pails of water and hand them to another man who passes them to a third and the last man, the foreman of the gang, fills and replenishes the pails in front of the steers till all have done drinking, some drinking as many as six pailsful at a time. In the same way the cattle are again watered at 2:00 o'clock in the afternoon, only being allowed one pail of water apiece.

To water 180 cattle takes four men one and one-half hours.

After watering they are fed hay, say six small bales to 130 head. At 9:00 o'clock, the cattle are given grain, either whole corn, ground oats, or meal. The troughs having been previously cleaned out, the grain is poured in from a bushel bag into pails and distributed in the same way as the water, the foreman of the gang feeding out the grain, giving one half pailful to each steer. After the grain has been fed, the alleyways are swept out and after being watered in the afternoon, the cattle are fed all the hay they can eat and more and what they do not eat is thrown under them for bedding. At 6:30 P. M., two night watchmen take charge till 4:00 o'clock the next morning.

> The morning the cattle are landed the knots are changed, the partitions between the different sections taken down and gangways cleared ready to run them off the steamer. As soon as the gangplank for the cattle is secured the agents for the shippers come aboard, take account of stock and take charge of the cattle when landed. When they begin to run the cattle off, the rest get impatient and bellow and stamp and pull at the ropes.

It was seen after many early attempts that the transportation across the Atlantic of live American cattle would not attain satisfactory success, and it was clear that if America were to send its beef and mutton as freely into English markets as it sent its grain, meat would have to go in the carcass.

Frozen Beef Experiments

The first experiments in shipping carcasses were not of chilled or dressed beef, but of frozen meat. Small quantities of beef hard frozen were sent to Smithfield Market from the United States. The hindquarters arrived in long boxes "as hard as stone," but bright and in good condition. This American frozen beef made about 2½*d.* to 3*d.* a pound, while English beef in 1874 was getting 9*d.* a pound. On the whole, however, this early frozen beef trade was quite small in volume and negligible as a market factor.[7] As with live cattle, Nelson Morris seems to have been the earliest shipper of dressed beef to the British Isles, but his first experiment was very crude, consisting of the shipment of a few carcasses of beef on the open deck of a vessel which arrived in England in bad condition.[8] The next shipper was John J. Bate of New York, who made a shipment of 12 quarters of beef, 12 sheep, and 6 hogs to Liverpool by the SS. "Baltic" on February 11, 1875. This arrived in good condition and was followed on June 6 by a larger shipment, and on August 10, by another cargo. On the first trip, the meat was kept cool and fresh by

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[7] Critchell, J. T., and Raymond, J. A History of the Frozen Meat Trade, pp. 190–191.

[8] Nimmo Report (1885), p. 172, letter of T. C. Eastman.

fan blowers operated by hand; later the fan blowers were operated by steam.

Dressed Meat Shipments

The first dressed meat sent to Europe in quantity as a commercial article was shipped by Timothy C. Eastman of New York, on October 1, 1875.[9] He is usually credited with being the real pioneer of the enterprise. Some of that beef was sent to Queen Victoria at Windsor Castle and Eastmans', Ltd., the English agency, received the Royal Seal as a result of that transaction. The Queen pronounced the meat to be "very good."[10] It was, then, with the year 1876 that the business of shipping dressed meat, or "dead meat," as it was called in England, to Great Britain developed a permanent relation to the demands of the English market and became one of the established features of the American meat packing industry.

At once interest was shown in England in the new meat trade, especially among the livestock producing class. It was rather surprising, however, to note that the newly opened enterprise had attracted very little attention in New York in the newspapers, or in circles outside the reporters, butchers, cattle salesmen, and farmers.

For sometime T. C. Eastman was alone in the trade. He shipped to Glasgow and Liverpool, where arrangements were made for forwarding to his markets in London, Manchester, Sheffield, Birmingham, Leeds, Newcastle, Dundee, and Edinburgh. To Liverpool he shipped by the William and Guion and the White Star Lines, and to Glasgow by the Anchor Line. His weekly exports in 1877 averaged about 1,000 cattle and 4,000 quarters of beef. However, as soon as the success of Eastman's experiment seemed assured, after the favorable reception of the first consignments, too many rushed

[9] Vaughan, Types and Market Classes of Livestock, p. 65; Bolles, Industrial History, p. 123.
[10] Critchell and Raymond, History of the Frozen Meat Trade, p. 190.

into exporting cattle, with the result that the trade was overdone. The majority of people whose enterprise failed did not have enough capital, much of which was required for erecting refrigerators in vessels, for a heavy premium was charged for space and refrigerators in the killing yards. Soon all lines sailing between New York and Philadelphia and England and Scotland—some eight in number—were carrying chilled dressed meat.

Refrigerator Processes

The process whereby Eastman kept his meats fresh was one invented and patented by John Bate. Eastman had special refrigerators built between the decks of the steamships of the William and Guion, White Star, and Anchor Lines. They were about 40 feet long, 28 feet wide, and 9 feet high. On one side was an ice box containing some 30 tons of ice.[11] A fan blower run by a steam engine kept the inside air in constant circulation around the meat. The quarters were neatly wrapped in canvas and kept in "chilling houses," or large refrigerators, before shipment and when put aboard the vessels the temperature was kept down to 38 degrees, or 6 degrees above freezing.[12] The cold to which the meat was subjected at first closed the pores and seared it so that it was not as susceptible to heat and taint as freshly killed meat. Eastman was fortunate in having his meat arrive as fresh and bright as newly killed beef and without losing any of its flavor.

Gillett and Sherman, another large New York shipping firm, exporting 2,000 quarters of beef weekly, prepared their beef on the New Jersey side of the river and used a different process, invented by a Dr. Craven—a freezing mixture being forced along pipes running between the rows of beef. They shipped to Bristol and Liverpool by the Cunard, Inman, and National Lines. D. Toffey and Brothers of Jersey City

[11] Taylor, C. H., History Chicago Board of Trade, Vol. I, p. 575.
[12] Bolles, *op. cit.*, p. 124; Critchell and Raymond, *op. cit.*, p. 191.

shipped about 1,200 quarters weekly by the Banta (fanning) process via the State Line to Glasgow and the National Line to Liverpool. Martin Fuller and Company of Philadelphia shipped about 1,400 quarters of beef every week from Philadelphia using the Bray (fanning) process by the American Line to Liverpool. Morris and Sherman, employing Dr. Craven's process, sent 1,000 quarters by the same steamship line to the same port. Snowden and McConville exported some 600 quarters of beef every week by three National steamers to London. F. Samuels and Company sent 300 quarters weekly to the same port, using the Smiley (fanning) process.

Shipping Preparations

For these shipments both cattle and sheep were brought into the stock sales, either by the farmers themselves, or in consignments by stock agents, the latter being the more general system, and then purchased by the exporters, cattle alive and sheep dead. After the animal was killed the meat hung for two hours to allow the natural heat to escape, and then it was hung in the refrigerators in the yards until transferred to those in the ships. Large permanent refrigerators were erected at the Jersey City stockyards and Mr. Eastman built and fitted up a large building for himself in New York City.

Other firms than these engaged in the export of sheep, but the mutton was all conveyed across the Atlantic in the name of these firms, as in this way it could be carried almost free of cost. The exporter paid so much for space in a steamship to erect a refrigerator, and between the rows of sides of beef there was ample room for a row of carcasses of mutton. This space otherwise would have been unused.

The trade increased with most extraordinary rapidity. In October, 1875, the shipments of fresh beef amounted to 36,000 pounds; in October, 1876, 6,707,855 pounds. For the year ending December, 1877, there were exported 55,362,793 pounds, valued at $5,244,688.

Distribution in England

On arriving in England, American beef was transported by rail to the large markets, such as London, the railways actually discriminating against the British cattle and beef by carrying American beef several shillings cheaper than the English beef, because of the great volume of the American trade.[13] The meat was carried in special cars, each quarter being wrapped in cotton to prevent its becoming dirty. In the large markets the beef was handed over for sale to agents, who received a small commission which was included in the cost.

Later on, however, the American exporters, such as Eastman, and Swift and Company, began to open stalls at Smithfield Market in London, paying heavy sums for the goodwill. These men were led to market their own beef because they did not "get a square deal from the Smithfield salesmen."

In spite of its rapid initial success the dressed beef export trade had great difficulties to overcome, which were similar to those it had to fight in the United States. For example, in 1879 a popular caricature had warned the London beef eaters against American beef. On one side was a magnificent sirloin with mingled streaks of white fat and red juicy lean which was labeled "Roast Beef of Old England." On the other side was a dark stringy slab of fly-blown flesh with plenty of sinew and gristle, but no fat, which was marked—"Here's your American beef! Take your choice!"[14]

British Prejudice Against Dressed Beef

A great deal of prejudice against American dressed beef is accounted for by the fact that when the dressed beef arrived in England and was taken out of the hold and exposed to the air, it naturally became soft and limpid and lost its bright appetizing appearance. While the meat itself was tender and

[13] *Lippincott's Magazine* (Nov., 1879), Vol. XXIV, p. 73.
[14] "Where the Beef Comes From," *Lippincott's Magazine* (Nov., 1879), Vol. XXIV, pp. 73-79.

good and wholesome, it did not compare favorably in appearance at first with English home-dressed beef. This situation was due more to carelessness than to anything else, and later shipments went in better shape. However, it was accentuated by the action of some exporters who adopted a short-sighted policy. Some shippers felt they must either abandon the trade for a time, or export an inferior quality of beef which they could buy in America at a lower price than the prime carcasses. Some adopted the former plan and a few the latter.

The trade in England was made more difficult by the fact of a combination among the British butchers, which was brought about for the purpose of stopping importations of American beef. It was claimed that the American article could never be as good as the English. The validity of this contention seemed to be assured by some incidents in the early months of 1878. The chilled beef trade was very greatly handicapped by a general fear of contagion, which led the British government to issue the first of a series of decrees against the importation of American cattle and meats which greatly injured the trade in later years.[15] Under this decree, foreign animals were to be landed only at a special part of the port, to be under regulation of the commissioner of customs and not to be removed from the wharf alive. The ports of landing were Barrow-in-Furness, Bristol, Grimsby, Hartlepool, Hull, Liverpool, London, Plymouth, Portsmouth, Southampton, and Sunderland. A little later the Privy Council by the authority of Act of Parliament issued an order prohibiting the landing of United States cattle, except under certain conditions: (1) such cattle shall be landed at ports with foreign animal wharves; (2) animals must be landed direct into abattoirs and remain there until slaughtered; (3) this slaughtering must take place within ten days from the time of landing.[16]

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[15] Taylor, C. H., *op. cit.*, Vol. I, pp. 575–576.
[16] *Breeders' Gazette* (Feb. 5, 1890), Vol. XVII, No. 6.

European Restrictions

The restrictions on American beef on account of alleged pleuro-pneumonia extended to pork products because of the alleged presence of trichinae. Other countries began to restrict the importation of American meats. Italy issued a decree in 1879 against American pork products, and Hungary, Spain, Germany, France, Turkey, Roumania, Greece, and Denmark followed during the eighties. A few years after Great Britain restricted the importation of cattle, some of the other countries, such as Germany, Denmark, Belgium, and France, prohibited their importation because of alleged Texas fever and pleuro-pneumonia.[17] These restrictions went into effect, although the official denial by Secretary of State Blaine regarding cholera reports disposed of a statement made to his government by the acting British consul at Philadelphia who had been imposed upon by speculators.

Yet in spite of this situation of opposition and prejudice, the chilled beef trade, especially in England, not only became important after 1880, but made a remarkable advance in the decade of 1888–1897, when it developed a leading position at London in Smithfield Market supplies.

Triumph of Dressed Beef

By the nineties, therefore, it was clear that the prejudice which clung to the "roast beef of old England," had given way of necessity to the foreign product. This, of course, had only come as a result of persistent and indefatigable effort. Among others, G. F. Swift had gone over to England many times and had personally seen that his orders were carried out and that his meat was kept to the front in the market stalls where it had an equal chance. The story is told that the triumph of American dressed beef came when a great London guild was giving a big banquet and one of the features was to be a

[17] Report of the Bureau of Animal Industry, U. S. Department of Agriculture, 1906, p. 9.

huge roast of English beef. The order was given to a friend of G. F. Swift, who believed in American beef and provided one. It was highly praised, and when it was found out to be American the guests were convinced of its worth.

There was, at the same time that the dressed beef trade expanded, a more careful attempt to encourage the trade in cured pork products. As a result there was a greater absolute, though it must be admitted a smaller relative, amount of salted meats exported, for the demand was increasing for fresher packed and lighter salted meats and the old-time barbarous heavily salted hard winter-cured bacon became almost a thing of the past. The use of borax caused this change, for by its use a fresher packed or milder cured article could be shipped.

During the nineties there were alternate reciprocity treaties enlarging the foreign market for pork and beef products. As a result of the law authorizing the inspection of exported meat and cattle which the European nations felt was a sufficient guarantee that shipments were free from trichinae, the barriers were removed. With the slightest rumor of Texas fever or pleuro-pneumonia diseases, however, the embargoes were reinstated. For example, in the spring of 1895, France issued a decree at the instance of the agrarian element. In 1894, the United States shipped $18,000,000 worth of cattle products to France alone and this trade was absolutely destroyed by order of the French government. Germany and Belgium also put on an embargo. Three years later the first commercial treaty under the Dingley Tariff Act of 1897 was concluded with France, by which a cut was made in the duties on American meats.

American Supplies Important

In spite of all obstacles, by the end of the nineteenth century the trade with Europe had made necessary a continuous service. The *London Meat Trades' Journal,* in commenting upon it, said that:

> The weekly receipts of American refrigerator beef and kindred products demonstrates anew the rapid growth and increased demand for these popular shipments, besides proving the prejudice heretofore existing against them has practically become obsolete.

Though the last statement was a poor prophecy, it was evidence that American dressed beef was a governing factor in the English market.

When the American beef supplies in London were short for a few days the price on all kinds of meat went up. A London paper remarked on this as follows:

> It is a fact that if the American supply was entirely cut off we should have famine prices in force, so large is the quantity consumed. One reason why English butchers buy American cattle is because they are sent over in such good condition. At home the farmers' cattle come to town in such a bruised state that the farmers lose by the loss of appearance and the butchers by the damage done to the meat. The American cars, on the other hand, are so well appointed that the beasts actually improve by travelling and arrive here without a spot on them.

American beef had become a standard in other countries also. In 1898, Russia and Japan asked for bids from American packers for supplying canned and salted meats for use in their armies and navies. Marketing agencies were opened up in the Orient. Swift and Company established distributing agencies in Tokio, Osaka, Shanghai, Hongkong, Manila, Singapore, and Honolulu. As far as Europe was concerned, the center of the foreign supply system was in London with distributing offices in many cities. In the principal cities of England, Ireland, and Scotland, the distributing plants were almost as prominent as they were in the United States.

Smithfield Market

In the Smithfield Market, London, the American packers by this time sold their meat directly and bought stalls or shops for the purpose, paying substantial sums for the goodwill.

By 1901, Swift and Company held six shops, paying as much as £12,000 sterling for the goodwill of one. Altogether, there were held by American packers some 5 per cent of the Smithfield stalls, or 17 in number.

The tremendous extension of the dressed beef trade naturally had powerful effect upon the production of livestock in the United States. The steady foreign demand for American fresh meats called the attention of the breeders of the Southwest to the necessity of immediate steps toward the improvement of their cattle. Improvement in quality of the cattle raised was followed by increase in American shipments abroad. The statement of English producers that American cattle exported to England were only equal in quality to second-class English cattle was no longer true.

Foreign Tariffs and United States Meats

From the beginning of the twentieth century the American export trade in meats was dominated largely by the attitude of foreign governments and tariffs, which was influenced by the agrarian parties and elements in those countries. As the Great War, 1914–1918, is really a period by itself, attention will be directed first to the period 1900–1914.

By 1900, Germany had become a large importer of American pork and pork products. For a time it seemed that mere economic necessity was enough to enable the trade to forge ahead, but as a result of the Spanish-American War and the popular cry of alleged "embalmed beef," the German agrarians began again with better success their attack on American meat.[18] Following an agitation in the Reichstag, a commission on meat inspection was appointed and reported a bill, which proposed to subject all imported livestock to inspection both before and after slaughter. Realizing that this action would absolutely stop all importation of American meats into Germany, and adversely affect to the value of some $80,-

[18] *The National Provisioner* (June 17, 1899), Vol. XX, No. 29.

000,000, annually, various American agricultural products, the United States broke off reciprocity negotiations with Germany. This action of the Reichstag commission was taken in spite of strong protests from chambers of commerce in some 125 cities, and the Reichstag itself resolved to insist upon the exclusion of salted meats as well as canned meats and sausages. The bill was passed on May 23, 1900. On the bill reaching the Bundesrath such pressure was brought by the agrarian party that it was at once published officially, thus becoming a law.[19]

Yet this was hardly done before the seriousness of barring American meats was seen. The German National Society of Dealers in American Meats published a statement refuting the agrarians' argument and declaring that American meats were harmless and healthful.

Although this agitation had been with reference to American meats especially, there had been no revision made in the general tariff since the nineties when Germany, Austria, and France had entered into a series of commercial treaties, by which the duties they imposed on products coming from all countries enjoying the most-favored-nation treatment were fixed until the close of 1903. As that time approached, important tariff changes were advocated in many quarters, and on December 25, Germany, Switzerland, and Austria adopted new schedules which affected meat and meat products.

Germany Prohibits Beef Imports

By the new German meat regulations the importation of cattle and fresh beef from the United States was prohibited.[20] The law stated that fresh meats could be imported only in whole carcasses, and as the American consul-general at Berlin pointed out, when there was added to that the prohibition under Section 21 of the law, of meats preserved with borax and anti-

[19] Taylor, C. H., History of Chicago Board of Trade, Vol. II, p. 1005.
[20] See German Meat Regulations (Fleischbeschau-Zollordnung) with original text, U. S. Department of Agriculture, Bureau of Animal Industry, Bulletin No. 50 (1903).

septic salts, it was clear that the net effect was to diminish the supply and increase the cost of meats in Germany.[21]

In 1905, the German government notified the United States that it intended to denounce the reciprocity treaty of 1900, and that after March 1, 1906, the exports of the United States and Germany would come under the maximum tariff provisions of the new German law. That left as the basis of the right for mutually favored commercial relations between the two countries only the old treaties concluded between Prussian and other German states and the United States before the Empire was established, some of which went back to 1828.

Due to the representations of the United States government, the German government agreed to a tariff truce. The Reichstag passed a bill averting the trade crisis which was at hand, due to the abrogation of the existing reciprocal treaty arrangement. The bill extended to the United States most-favored-nation rates under the new German tariff for a year, or until July 1, 1907. This was not a real victory for the United States, as the new preferred rates were increases on old duties, though not always as high as the new general tariff.

With fresh meat shut out entirely, cured meats, both beef and pork, had until 1906 been sent in large quantities to Germany and had played a very important part in the food supply in all the principal German manufacturing and mining districts.[22] However, the military ideal of national self-sufficiency had led the government to encourage the raising of cattle, allowing importation of cattle foodstuffs without duty and putting a severe restriction on meats, with fresh meat entirely prohibited and cured meat partly handicapped by prohibitory duties and inspection laws. Germany was a field for by-products only, such as lard, including neutral, and steam lard, oleo oil, sausage casings, tallows, and raw products, such as hog hair, bones, and hides.

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[21] *The National Provisioner* (July 19, 1902), Vol. XXVII, No. 3.
[22] *The National Provisioner* (Aug. 12, 1911), Vol. XLV, No. 7.

French Restrictions

France had enacted a tariff law in the nineties, which was amended by a commercial agreement with the United States in 1898, by which France granted the minimum rates of duty on certain specified products, which included canned meats, sausages, and similar products; and all meat animals of United States origin imported into France (with all articles imported into Spain from the United States also), were subject to higher rates.[23]

Like Germany, France required, after the Spanish-American War and the furor of so-called embalmed beef, rigid inspection of all meat animals, fresh meat, and sausages, when imported from the United States. A certificate of inspection from the United States Department of Agriculture was required for all pickled or smoked pork products imported from America. Meats could be imported only at designated customs houses and in certain forms of shipment in order that rigid inspection could be made. For this service, fees were charged as in Germany, which naturally increased prices and limited importation.[24]

By 1907 the attacks on the sanitary conditions of the packinghouses in Chicago led the French customs administration to refuse the meat guarantee and to require microscopic examination. Considering the situation, Secretary of Agriculture Wilson pointed out that a very insignificant quantity of American meat was exported to France anyway, as the laws had been so strict that it did not pay to cater to this trade.[25] It was soon seen that France was suffering from this meat exclusion policy, and the government decided to waive its demand for a certificate of microscopic inspection for all imports of pork meat from the United States. A temporary tariff arrangement similar to that with Germany was entered into, and the United States inspection stamp was accepted.

[23] *The National Provisioner* (Jan. 20, 1906), Vol. XXXIV, No. 3.
[24] *Ibid.* (Jan. 20, 1906), Vol. XXXIV, No. 3.
[25] *Ibid.* (May 4, 1907), Vol. XXXVI, No. 18.

American meats were welcome in France, as in Germany, to all but the agrarians and the stock raising element, since there was almost a meat famine in the country due to two fundamental facts: first, the policy of the French government, which by protective measures sought to stimulate the breeding of meat producing animals in France, and second, the fact that notwithstanding this encouragement, the production of home-grown meats, both beef and pork, had remained below the normal requirements of the people.

Trade Wanted United States Meats

While French politicians were trying to make capital out of an alleged plan of American packers to invade France and control the meat market, the French provision dealers and butchers were complaining of a scarcity of home-killed meat which approached a famine. For example, M. Canus, president of the Paris Butchers' Syndicate, declared that if conditions were not relieved, there would be a lamb and mutton famine in Paris. The syndicates of provision dealers from Marseilles, Bordeaux, and Havre petitioned the government through their deputies to withdraw its prohibition and allow American bacon, hams, and other preserved pork meats to be imported under the so-called "interstate certificates of inspection," which were recognized and accepted by Great Britain, Italy, and Spain, indeed, in all countries except France, Germany, and Austria. *Le Matin* published an article and a map showing the chief supply centers of all France and declared that the alimentary products furnished by the majority of them had been of a death-dealing kind and that though 25 cities had municipal laboratories for testing food, they did not include Marseilles, Bordeaux, Rouen, Nantes, Caens, Amiens.

English Agitation

The United Kingdom, on the other hand, imposed no duties whatever on the importation of live meat animals or packing-

house products, but in 1906, after the publication of Upton Sinclair's "The Jungle" and the various "investigations" and the new Food Law, there was a great disturbance in England regarding all meats.

A universal shout went up from the English meat packers to the effect that had "home industries" been patronized, there would have been no cause for alarm. Almost at once the importation of American canned meats dropped off. No opportunity was lost by the packers themselves and the trade generally to belittle American products of every kind, and while wrecking the American exporters, these packers made desperate attempts to get their own products promptly before the public. Stores in various parts of London displayed big signs reading: "No American tinned goods sold here—British products only," and "Use honest British goods—don't eat vile American stuff." The triumph, however, was not for long. Dr. F. Cooper, one of the best known medical men, who was also a member of London County Council, stated that:

> The public has no conception of the filthy conditions prevailing in most of the English slaughterhouses, especially the small private ones. Most of the small slaughterhouses are absolutely without any inspection whatever; the butchers may kill when they like and under whatever conditions they please. The places reek with filth; they are never properly cleaned up and the conditions make it unfit for human consumption.
>
> As for meat inspection in this country, it does not exist. Inspectors have no training and go by sense of smell—know nothing of bacteriological or microscopic examination.[26]

British Meat Regulations

The British government, in 1908, issued for the first time through the local government board, certain food regulations called "Foreign Trade Regulations of 1908." This was authorized by an act of Parliament, a Public Health Act, in

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[26] *The National Provisioner* (Sept. 22, 1906), Vol. XXXV, No. 12, p. 17.

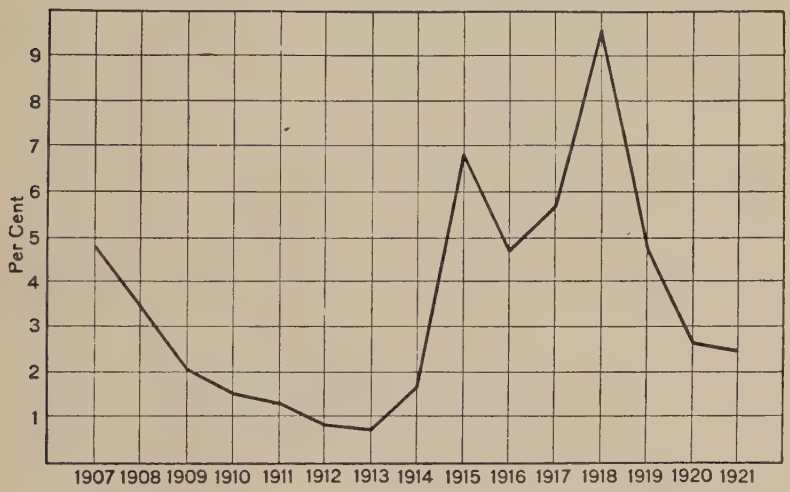
1907, and did not apply to Scotland and Ireland. Its purpose was to regulate the importation of foreign meats and meat products. Up to that time the regulation of meat imports had been left largely to local health authorities, and even with the act of 1907 no such government inspection was provided as existed in the United States. There was no force of government inspectors to carry out the regulations. Their enforcement was delegated to customs officers, local medical health officers, port sanitary authorities, and other hygienic officials.

These regulations provided for the examination of foreign meats by customs officers and medical health officers, notice by the sanitary authorities to the importer, the destruction of the condemned foreign meat, proceedings for proof that the meat was not intended for sale, the prohibition of removal or sale of the meat in certain cases, the keeping of records of meat destroyed, improper landing or transportation of the meat. In doing this the regulation divided meats into two classes: (1) fresh beef, cured pork provisions, canned meats, etc., which were admitted without inspection, provided they bore a recognized certificate from an official source at their place of origin; they could be held, however, and subjected to inspection, should there be any doubt as to their condition; and (2) a class including scrap meat, preserved tripe, hog carcasses without head or glands. These were not admitted without inspection and certification of their healthfulness.

With regard to these regulations the United States Department of State took the matter up with the British government, but the latter would not recede, and the Bureau of Animal Industry advised the State Department that it did not see fit to furnish inspection for export pork which it did not give for domestic consumption. The United States quite rightly insisted on the efficiency of its inspection and quarantine service and procedure relating to the importation and exportation of livestock.

Recent Meat Exports

From 1905 the United States gave way to the Argentine as the great meat exporting country of the world, yet meat and meat products have continued to be a much more important export than is generally realized. The increase in the use of refrigeration in the meat packing industry has led to a rather widespread belief that our exports of meats have practically ceased. Yet, as has been pointed out, these exports averaged nearly the same in value between 1910 and 1914 as



Courtesy Institute of American Meat Packers

Figure 16. Percentage of Beef Production Exported from 1907 to 1921

those of the period 1895–1899, though not as great as they were during the years between 1899 and 1910, as shown by the following table:

Period	Exports
1895–1899	$142,000,000
1900–1904	181,000,000
1905–1909	183,000,000
1910–1914	144,000,000

With the war period, as would naturally be expected, the trade in meat and its products from the United States showed

an immense gain, reflecting higher prices and greater demand. This trade can be summarized in the following table:

Fiscal Year	Exports
1915	$ 259,000,000
1916	279,000,000
1917	370,000,000
1918	845,000,000
1919	1,014,000,000
1920	463,000,000

Wartime Pork Shipments

To see clearly the war situation, it is necessary to consider pork exports and beef exports separately. The United States has always been a very large exporter of pork products. In the fiscal years ending June 30, 1898 and 1899, the high point of 1,678,000,000 pounds was reached, and this was not equaled again until the fiscal year 1918. In the five years, 1910–1914, the lowest point was reached in a period of 28 years, but at the beginning of the war in 1914, a steady rise in exports became apparent, reaching the culmination in 1918 under the stimulus of a large foreign demand and as a result of the conservation practiced by the American people. In March, 1918, the exports reached the enormous shipment of 308,000,000 pounds, with only a slightly smaller shipment in each of the two succeeding months. A shipment that averages 10,000,000 pounds each day of the month and is equivalent to the daily slaughter of 66,000 hogs is an accomplishment that no other country in the world could equal.

In July, 1917, before the United States Food Administration was a legal entity, but when the food problem was beginning to be appreciated in this country and conservation was beginning to be preached as a war necessity, the exports of pork products were the lowest reached in any month previous to that time. The remaining months of the year show very small shipments, also, in relation to the foreign needs and the corresponding months of the two previous years of the war.

Very short supplies and transportation difficulties were mainly the cause.

As a result, in February, 1918, extremely urgent demands were made by the Allies for pork shipments. The further prosecution of the war was shown to be directly dependent on immediate meat and wheat supplies being sent to them. At that time a program was worked out in detail, calling for 300,000,000 pounds of pork products per month for the following three months. It was an undertaking that many considered entirely impossible, but the program was carried out within 25,000,000 pounds of the planned total of 900,000,000 pounds, and the absolute requirements of the Allies were met.

Previous to the United States' entrance into the war, exports of pork products were made to all parts of the world, but immediately on the entrance of the United States, export embargoes were placed preventing shipments except to particular countries and making meat shipments, as far as possible, war supplies. Therefore, the increase in total exports in 1918, over 1917 or 1916, does not alone tell the full story of the participation of the United States in the feeding of the Allies, for it is evident that practically the entire export went to the allied countries in 1918, and that a much larger proportion went to them than in 1917.

Wartime Beef Exports

From 1890 to 1909 the exports of beef products from this country in fiscal years beginning July 1, were maintained at a high level, reaching the highest point of the period in 1906. From that point, there was a gradual decline to the year 1914, when the exports fell to the extremely low amount of 146,000,000 pounds.

Almost coincident with the beginning of the war in Europe, in August, 1914, the exports began to show a very material increase each month, resulting in a total for the calendar year 1915 of two and one-half times the amount exported in 1914.

In March, 1918, immediately after the urgent appeal was made for more food by the Allies, 87,000,000 pounds were sent as a total export, and in the three succeeding months even greater amounts were forthcoming from this country. The total for one year was 773,000,000 pounds, which was over three and one-half times as much as was exported on the average in the three pre-war years (1911, 1912, 1913).

When it is realized that of the total export in March, 62,000,000 pounds was fresh beef that required refrigeration from the time it left the packinghouses to its delivery overseas, in refrigerator cars and on shipboard, the full measure of the efforts is appreciated; and this does not include the shipments to the American overseas forces. Just before the war began, the United States exported somewhat less than 3 per cent of the total production of beef each year, but in 1915, the proportion jumped to 6.6 per cent, and in 1918 to 8.56 per cent.

German Postwar Demand

After the war ended in November, 1918, it was hoped that the export trade would develop in steady fashion, not only with nations which had been neutrals, but also with those which had been belligerents. Those countries had one point in common, namely, the need of the importation of American foodstuffs, particularly meats and grain. At first there was a great obstacle in the lack of ocean shipping, and just as this began to disappear an increasing obstacle was found in the exchange situation. This currency situation has grown steadily worse and only a drastic remedy can succeed.

Even with such obstacles in the way, however, it was absolutely necessary for countries like Germany to get American meats. An official census in 1920 showed that Germany had about 3,500,000 horses, 16,789,000 cattle, 5,000,000 sheep, 14,100,000 hogs, and 4,000,000 goats. In 1913, she had had 21,000,000 cattle and some 25,591,000 hogs.

The German government succeeded in negotiating purchases of food with foreign countries during 1920, and one of the contracts made was with American packers for the delivery of food worth $45,000,000, or 2,759,000,000 marks. Payment was to be made under a special amortization plan beginning in May, 1920, and continuing for 18 months. The goods were in warehouses in Hamburg, Rotterdam, Amsterdam, and in Scandinavia, and delivery began at once. The American meat industry led the way in aiding the revival of German foreign trade by granting credit, which was the only way out. During the summer of 1920 the Bavarian government announced the abolition of the meat card and the Berlin government abolished it as a national institution September 1, 1920. By October, 1920, Germany was free from livestock and meat control. This was in response to an agitation on the part of meat dealers, e.g., the United States meat packers, the butchers of Germany, the labor unions, the Social Democrats, the co-operative buying assocations, and consumers in general. Prices of meat are now cheaper in other foreign countries than in Germany and free imports would lower the cost to consumers. As before the war, there are opposing this the agrarians of Prussia, who have formed associations for selling stock and wish to prevent imports, but their influence is not what it was. The exchange situation in 1922, however, prevented revival of trade.

British Meat Situation

The same general situation exists in Great Britain. The underlying factor is a desire on the part of the livestock producers on the continent of Europe and in Britain to make themselves as self-sufficing as possible. This is impossible for Britain, but she is trying to limit her overseas sources of supplies to the Empire, a perfectly natural attitude for her.

In studying the problem of British meat supplies, the British government came to certain conclusions as to the present

situation of the American meat packing industry and the meat trade between the United States and Great Britain. At first a committee was appointed by the Minister of Reconstruction to investigate the question of trusts, and in its report, issued on April 24, 1919, a whole chapter devoted to the "American Meat Trust" accepted without further inquiry the report of the Federal Trade Commission on the Meat Packing Industry as evidence of combination and control in the industry in this country and of the trade with Great Britain on the part of five of the larger packers.

Acting on this report, a subcommittee was appointed to devise methods to combat this threatening monopoly in the meat trade and to obtain free sources of supply from the British dominions and South America. This committee reported to Parliament, November 9, 1920, that the fear of American companies getting control of the British meat trade had been greatly exaggerated and there were no signs of the Americans trying to capture the home-killed trade or reduce British butchers to a state of dependence.

Empire Needs United States Beef

The report pointed out that while the Empire should be self-supporting in mutton and lamb, it could not be in beef. In 1913–1914 about 50 per cent of British supplies of beef and veal were produced at home, about 7 per cent in British dominions, and nearly one-third in foreign countries. These countries were mostly in South America, and United States packers had through their South American plants nearly 60 per cent of the beef output of Argentina and Uruguay, and about 75 per cent of the capacity of Brazil.[27]

[27] The American companies referred to are Armour and Company, Morris and Company, Swift and Company, Wilson and Company, Inc., and the LaBlanca Company (owned by Armour and Morris) which import meats from their own plants in South America. There are also two British companies, the British and Argentine Meat Company, Ltd., and one Argentine company (The Sansinena Company) which have been co-operated through the River Plate Conference. Another company registered in the United Kingdom and connected with the Union Cold Storage Company, Ltd. (Vestey Brothers, Ltd.), has also had plants in Argentine and Brazil since 1917, but acts independently.

Recommendations made by the committee urged that the British government prevent the share of the beef trade in foreign hands from increasing, that foreign companies be taxed on total profits wherever made, that British packing plants in South America be supported by government and also shipping used for transporting meat to prevent further growth of foreign companies, and that consuming countries take action to limit the business of American companies.

These recommendations were made in spite of the facts admitted that: (1) "it was impossible even for the strongest combination to control prices in Smithfield for more than a few days, partly because climatic reasons and the deterioration of chilled beef in cold storage forced quick sales, partly because a rise in prices speedily evoked an increased supply of home raised meat; (2) that no complaint was made of unfair trading on the part of the American companies except that in 'developing' trade or in clearing surplus stocks they would make no limit in cutting prices. Most of the witnesses praised them for their enterprise in placing cheap meat of good quality before the public and for giving good service to their customers"; (3) that the share of British trade held by the American companies had increased, but "the strength of the American companies depends more on their wealth and business ability than on any conjoint action in this country."

No Meat Monopoly

Indeed the final Report on Meat prepared by the subcommittee appointed by the Standing Committee on Trusts and presented to the British Parliament in the spring of 1921 had made a more careful inquiry, and concluded (Section 13):

> The Federal Trade Commission reported that a combination exists in the United States between the five large companies. Our witnesses who had bought in the United States assured us, however, that they had never perceived anything but keen competition among the large packers.

There is, moreover, a growing body of opinion voiced by Sydney Brooks in the *Fortnightly Review* for December, 1920, which seeks to allay this popular apprehension of mere size, which was reflected in the earlier reports. If there is one thing more than another, according to Brooks, that the British should have learned from the war, it is that British businesses are not large enough. This is upheld by governmental committees, when dealing with the iron and steel and engineering trades. Among other things, their small size is "an almost insuperable obstacle to the organization of research." It is pointed out that there is no basic commodity produced by Big Business today which cannot be put out in much greater quantities of a better quality and at a far lower price than in the days when its production and distribution were in the hands of small men with limited capital and equipment.

Meat Industry Economic Benefit

In the matter of meats, Mr. Brooks holds that:

> The problem is to devise ways and means which will link producers more closely together so that food will be distributed as widely and as cheaply and as expeditiously and in as wholesome a form as possible. The American packing industry has eliminated the middleman of which class there are far too many in Britain. Three or four more operations on each of which some merchant makes a profit are needed to bring New Zealand lamb to the British dinner table, than are required to bring beef or bacon. The American packers may justly claim to have reduced to a hitherto unattainable minimum those intermediary charges for manufacturing, transporting and merchandising which as a rule are so disproportionately high that the producer receives too little and the consumer too much.

The conclusion reached is cogent at this time. It is that governments and public opinion should inquire very carefully and move very cautiously before electing to thwart an industrial development which is not only an economic necessity, but on the whole a clear national and international benefit.

CHAPTER XIV

PRESENT TRENDS OF THE AMERICAN EXPORT MEAT TRADE

American Beef Exports

The previous chapter on the development of the American export meat trade dealt with the later phases from the point of view of foreign political policy rather than from that of practical operation. At the risk of some little repetition there will be considered here the distribution of American meat products among various foreign countries according to their individual tastes, and the methods of packers in filling foreign orders, including details of shipping.

At the present time, as for many years before the war, the American export business in meats is done largely in pork products,[1] and since beef must compete in domestic markets against pork, it is interesting to note that the level at which that competition is conducted is influenced to no inconsiderable extent by European demand for hog products. This demand is created, directed, and limited by such a multiplicity of factors as to make export trading one of the most difficult, sensitive, and fascinating of all businesses. Nothing can illustrate this point better than the course of the American export trade in beef between 1914 and 1921, as shown in compilations issued by the United States Department of Agriculture which by giving quantities rather than value show more clearly the different trends as noted in the previous chapter. In 1914

[1] Based largely on special study and on "The Export Traffic in Meats," by C. E. Herrick, former Chairman, Traffic Committee, Institute of American Meat Packers, in *The Producer* (May, 1922), Vol. III, No. 12. This excellent article summarizes the situation admirably. Mr. Herrick is now (1923) President of the Institute of American Meat Packers.

the shipments of beef abroad, which had been steadily declining for some years, totaled only 95,000,000 pounds. The next year this figure had grown, because of the war, to 399,000,000 pounds—an increase of 320 per cent in one year. By 1918 yearly exports of beef from the United States had mounted to 728,000,000 pounds, equivalent to about 10 per cent of all the beef produced in the United States. Only three years later, in 1921, shipments of beef from the United States had shrunk to 52,000,000 pounds, equivalent to only eight-tenths of 1 per cent of the beef production, which was a decrease in this period of more than 675,000,000 pounds in the effective foreign demand for the primary products of American cattle.

Pork Export Cycle

During this period pork had been passing through a cycle somewhat similar. According to the compilations of the Department of Agriculture, exports of hog products during the four years previously mentioned were as follows: 1914, 377,000,000 pounds; 1915, 906,000,000 pounds; 1918, 1,724,000,000 pounds; 1921, 748,000,000 pounds.

On analyzing the export figures the following facts emerge:

1. Pork exports showed an increase of more than a billion pounds, or 360 per cent, from 1914 to 1918.
2. Pork exports showed a decrease of nearly a billion pounds—976,000,000 pounds, to be more nearly exact—from 1918 to 1921.
3. To produce 976,000,000 pounds of pork—the decrease from 1918 to 1921—about 6,000,000 hogs would be required.

It might also be stated that pork exports were heavier in 1919 than in 1918, so that the tremendous slump in foreign trade from which American packers and producers suffered so severely occurred—generally speaking—within the brief period of two years.

Decline in Meat Exports

Using figures from the source already cited, consider the years 1918 and 1921. In the former, 8,854,000,000 pounds of pork products were produced and 1,724,000,000 pounds were exported; in the latter, production had fallen off only 4 per cent as compared with 1918, while exports had fallen off 57 per cent. As a consequence, more pork products had to be consumed at home, which means that the domestic purchasing power was less in 1921 than in 1918. The tendency of all this was, first, to place more pork in competition with beef on the domestic market; and, secondly, to place this greater amount of pork in competition with beef for the consumer's meat dollar at lower levels.

The severity and consequences of the slump in exports were aggravated, especially during 1921, by the fact that wholesale meat values abroad, like those at home, declined tremendously. While the quantity exported was shrinking, the value was shrinking even more. This is shown clearly in two statements issued by the Institute of American Meat Packers and based on official statistics of the United States Department of Commerce.

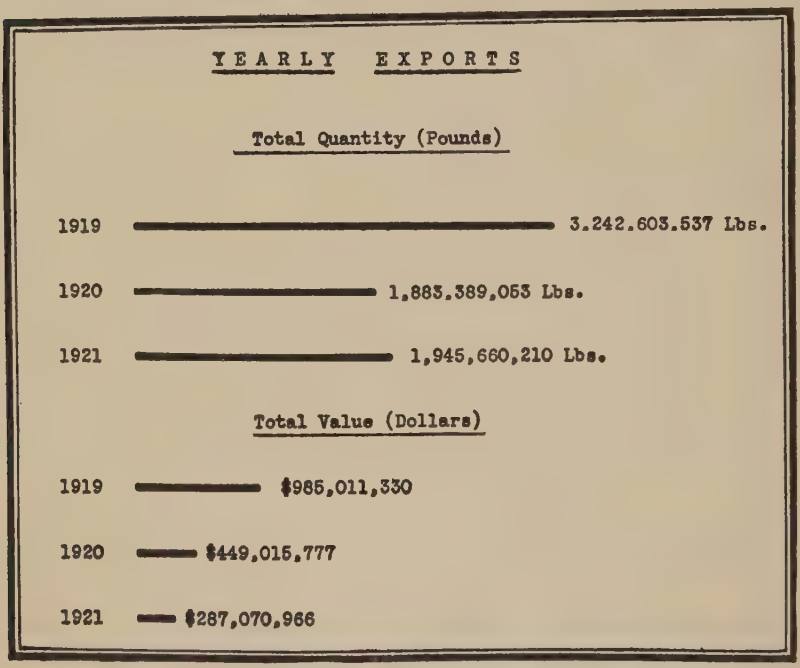
Although exports of meat and meat products during 1921, as compared with 1920, showed an increase of 3 per cent in quantity, the value decreased 36 per cent, according to official figures now available. Exports of all kinds of meat and meat products during 1921 aggregated 1,945,660,210 pounds, worth $297,155,180, as compared with 1,883,389,053 pounds, worth $462,500,064, during 1920. These figures indicate the tremendous declines which have occurred in wholesale meat prices during only one year.

Meat Exports in 1921

One of the outstanding features of the year's export trade was the great increase in the amount of lard shipped to other countries. During 1921 exports of lard—892,883,645

pounds—were about 270,000,000 pounds, or 40 per cent heavier than during 1920, but the value decreased about $33,000,000, or 22 per cent. A comparison of 1921 and 1913 figures shows that lard exports in 1921 exceeded 1913 shipments by about 317,000,000 pounds.

Exports of hams and shoulders in 1921, as compared with 1920, increased about 24 per cent, or 47,000,000 pounds, in



Courtesy Institute of American Meat Packers

Figure 17. Chart of Yearly Exports of Meat and Meat Products

quantity, but decreased more than 6 per cent, or $3,000,000, in value. "Bacon" exports showed decreases both in quantity and value. The quantity exported in 1921 was 415,299,522 pounds, which was 34 per cent, or 221,376,050 pounds, less than in 1920, and the value in 1921 was about 56 per cent, or $88,121,905, less than in the preceding year. Exports of fresh beef during 1921 amounting to 10,412,790 pounds, were

the lightest since 1913, when only about 7,000,000 pounds were exported.

Average Value of Exports

The average value per pound of all meat and meat products exported during 1921 was 14¾ cents, as compared with approximately 30½ cents in 1919, the peak year. This represents a decline from 1919 of more than 51 per cent in price. The average value per pound of meat exported during the month of February, 1922, was only slightly above the value per pound of meat exported during February, 1913.

The export figures cover fresh, pickled, and cured meats of all kinds, animal fats, sausage, and sausage casings. Many of the pork cuts exported are unfinished; that is, they have not been smoked and otherwise fully prepared for the consumer's use. With allowances for such considerations, the value of meat exports per pound is in line with average wholesale prices prevailing in the United States.

Meat Export Markets

The present distribution by countries of American meat exports is a matter of some interest. Here, too, war had made differences; but now, as normally, the United Kingdom is our best export customer, with Germany next. In discussing this foreign trade situation, the heads of export departments of meat packing companies usually attempt to distinguish between two general sources, or groupings, from which the demand comes. These two groupings are "the U. K." and "the Continent"—meaning, of course, the United Kingdom and continental Europe. Within this latter group the different sources of demand are usually further classified as follows: Germany, with Hamburg as the chief trading port; the Netherlands, with Rotterdam as the port; Belgium, with Antwerp; and the Scandinavian countries. Italy and other individual nations are generally considered by themselves.

It is of course true that ports have a key relation to the export trade. Thus an export trader, in summarizing business with Holland and contiguous trade territory, might say: "The break in the exchange value of the mark in March practically stopped even the slow trading which had been going on with Hamburg. It also affected business with Rotterdam, since some trading with Hamburg had been carried on through Rotterdam."

Where United States Products Go

While it is unsafe to speak in set terms about the relative importance of the specific foreign outlets for American products, since the export trade is still changing and a generalization which is true now may not be true this time next year, an analysis of our export trade during the calendar year 1921 is valuable. For it shows that the United States' three best customers—ranked in order in each case—for some of the chief export of meat products were as follows:

Bacon: United Kingdom, Germany, Netherlands.
Hams and shoulders, cured: United Kingdom, Canada, Cuba.
Lard: Germany, United Kingdom, Cuba.
Neutral lard: Netherlands, United Kingdom, Norway.
Oleo oils: Netherlands, France, Norway.
Beef, pickled and otherwise cured: Newfoundland and Labrador, United Kingdom, Norway.
Beef, fresh: Belgium, United Kingdom, Mexico.

This list would be meaningless without some information as to the relative importance of the different items. The following table shows the total amount of each of various meat products exported from the United States during 1921:

	Pounds
Lard, including neutral	892,883,645
Bacon	415,299,522
Hams and shoulders	232,380,427
Oleo oil	127,977,713

	Pounds
Pork, fresh	56,083,263
Lard compounds	48,206,583
Pork, pickled	32,850,107
Stearin from animal fats	32,696,424
Sausage casings	31,521,187
Beef, pickled, etc	24,570,582
Tallow	13,797,928
Beef, fresh	10,412,790
Mutton, except canned	7,515,438
Sausage, all other	6,352,131
Beef, canned	6,077,248
Oleomargarine	3,329,049
Sausage, canned	2,556,091
Pork, canned	1,150,082

Hog Types and Export

American packers have sometimes been criticized because they have not urged American producers to breed a type of hog specifically adapted for the export trade. Those who advance this suggestion overlook several elements in the situation: first, that domestic rather than foreign demand constitutes by an overwhelming ratio the biggest part of the market for American pork products, and hence for American hogs; secondly, that the export trade fluctuates in its volume and its requirements, and hence that the producer who directs his breeding operations toward a particular export demand may find that when his hogs are ready his specific market is not; thirdly, that the American hog produced for domestic needs also is adapted to furnishing the cuts which continental Europe normally seeks from the United States; and, fourthly, that it would not be practical for farmers in the leading hog producing sections to attempt to raise a pronounced "bacon type" of hog on the corn ration that is so well suited to the production of the "lard type" of hog.

It is true, of course, that different countries and different groups of countries differ in their tastes. These differences naturally create different foreign trade needs, which are

reflected in the American packer's demand for hogs and in the cure he gives to his various products.

Britain Wants Light Hogs

The United Kingdom wants hogs of lighter weights, for the Britisher likes his meat lean. He also insists that it have a very mild cure. These two preferences of his palate constitute two fundamental elements in the English trade which always must be kept in consideration. How important these two appetite factors are is demonstrated by the fact that it is not uncommon for Danish bacon to sell at wholesale in England several cents a pound higher than American bacon, which appears at first to be strange. The explanation, however, is both simple and convincing. In the first place, Denmark, like a number of other European countries, lacks an abundance of feedstuffs, and consequently is disinclined to hold hogs for a long time or to feed them sufficiently to make them very fat. Moreover, the character of much of the Danish feedstuffs—barley, beans, cowpeas, and skimmed milk—does not result in the addition of the same amount of fat for each month of feeding, as is the case in the United States. That is why Danish hogs make lean meat. As a result of long years of feeding and breeding hogs for the bacon trade, the Danes have evolved a longer, leaner type of hog than that produced in this country. In the second place, Denmark is much nearer to England than is the United States. A shipment from Denmark may reach England within 48 to 72 hours from the time it left the Danish port. Moreover, the whole journey has been by salt water, through sea-cooled air. Under such circumstances it is possible to give Danish bacon a very brief cure. However, it is not to be conceded in any sense that the Danish cure is superior to the American cure. The important point is that the Danish producers have evolved a type of hog especially adapted for the definite requirements of British bacon trade.

Wiltshire and Cumberland Cuts

It has been stated already that the Englishman likes his pork lean. On this account only hogs weighing about 140 to 200 pounds are adapted for making pork cuts destined for the United Kingdom. Further, the hog to be used in the British trade should be a "smooth" animal. When dressed, the resulting cuts are distinctive, both by name and shape. The two most famous English cuts are the Wiltshire and the Cumberland. The Wiltshire may be defined, for practical purposes, as the whole dressed side, including the ham; and the Cumberland may be similarly defined as the whole dressed side except the ham, which has been removed.

Reference to the export tables previously cited will indicate that American packers send to the United Kingdom enormous quantities of "bacon." It should be noted here, however, that in the export trade with England this term may include many cuts besides the usual variety of bacon which so often accompanies eggs to the breakfast tables of hundreds of thousands of American families. It may include not only bellies, as one would anticipate, but also Wiltshires, Cumberlands, short clear backs, etc. For example, the Wiltshire is the sort of side which English consumers commonly order. Practically all the sides which Denmark ships to the British Isles are Wiltshires. A Wiltshire includes the ham. Consequently, Denmark, having sold the ham with the Wiltshire, cannot sell the ham separately, but England is a big buyer of hams as separate cuts. These hams are cured in "pickle" from 40 to 60 days, the period depending on the size of the hams and on the season of the year—the warmer the weather, the longer the cure. The "pickle" consists of water, salt, sugar or syrup, and saltpeter. The chief effect of this last ingredient is on the color.

Shipping Hams to England

Hams are shipped in boxes, by train and refrigerator vessel. When they reach England, they are usually either

smoked and then sold, or "pale dried," i.e., washed and hung in a fairly cool, dry room until the surface moisture has evaporated, and are then ready for market. When the Wiltshire reaches the English traders, ham and shoulder are cut off. This leaves what corresponds to the American short clear middle, which, in turn, may be split, leaving a short clear back and belly.

The American packer who exports meats to England competes with Danish, Swedish, Dutch, and other continental European products; with Irish and Canadian provisions; and with a certain quantity of home-produced supplies. Canada uses feeds that make leaner hogs than the American, and at the present time is urging her producers to aim at the "export type" of hog. Ireland, too, raises leaner hogs with firmer fat. The Irish do not feed hogs in droves, and the feedstuffs used include slops, beans, potatoes, and skimmed milk. China offers some competition in the United Kingdom on lard and on meats, but it is not to be compared with that of the nations just mentioned, all of which, except Canada, enjoy one large advantage, viz., proximity.

What Europe Wants

Continental Europe, under normal conditions, takes many cuts of meat which are not marketable at home in adequate volume. Examples of such cuts are heavy fat backs and heavy clear bellies. The southern states in America, of course, ordinarily buy some of these heavy sides, but always at a decided discount as compared with lighter sides; and fat backs, light or heavy, are practically unknown in the retail trade in the United States.

There was a time when Germany prohibited the importation of meats weighing more than two kilos, thus letting in sausage, but permitted the importation of live hogs. At that time Scandinavia sold Germany live pigs when they reached a weight of perhaps 60 pounds, and then bought cured pork

from the United States. The explanation of what seemed a paradox is as follows: Scandinavia, with a cold climate, wanted heavy, fat pork, but in order to finish and fatten hogs accordingly would require imports of cottonseed meal, corn meal, etc. The Scandinavians avoided this necessity, to a degree at least, by selling their hogs at an early age and importing side meats from the United States. Germany had considerable quantities of feeding stuffs, refuse from her beet sugar industry, for example, and she paid a good price for the pigs, because that was the only form in which extensive pork supplies could be imported. At the same time, the outlet to Scandinavia for American pork took care of a considerable quantity of our heavy side meats, for which there was little domestic demand.

Changing Conditions

Today the situation is entirely different, not only in the fact that the German regulations on importations have been changed, but also because the Scandinavian countries, having extended themselves on credits to central Europe, are not financing imports of meats or feedstuffs as extensively as might be desired. In addition, on account of the exchange situation, Scandinavia is more nearly self-supporting with respect to pork, since these countries now refrain from exporting their young pigs to the same extent as formerly, but instead, fatten them as much as is possible without bringing in an undue quantity of feeding stuffs from this side of the water.

Continental Europe, in general, although needing pork stuffs badly, has focused its purchasing rather heavily on fats and oils, somewhat to the exclusion of heavy bellies and fat backs. Difficulties of finance have caused this situation, which brings up the question of payment. Before the war there were four methods by which European nations could pay: first, gold shipment; secondly, sale of United States securities owned abroad; thirdly, shipment of manufactured goods; and

fourthly, offsetting against their debts to us their credit balances due from other nations, thereby compelling their own debtors to finance in one of the ways just enumerated.

How Europe Pays for Meats

The method of gold shipment has now been practically eliminated on account of our heavy holdings of gold, and the second method has been eliminated by the sale to us during the war of United States securities owned abroad. Some business is being financed in rather limping fashion by the third method, while the fourth is of limited usefulness on account of the restricted production in foreign countries, with the consequent difficulty of creating credit balances. Most continental countries, especially those having devastated regions, have recuperated slowly with respect to their ability to send manufactured goods abroad in great quantities. They have had difficulty in deflating labor costs, as well as with their expensive stocks.

None of these conditions, however, should be interpreted as an assertion that export trade is at an end. On the contrary, meats are being exported in considerable quantities, and it is worth while to examine the normal tastes of some of the individual countries.

Scandinavia Takes Heavy Hogs

Scandinavia, for example, likes heavy hogs. In the winter the products from these hogs can be shipped with relatively light cure, because they are packed in salt and because they are going to a cold climate. In cold weather the cure completes itself while the goods are in transit. In warm weather this is not possible, and the cure must be completed in the packer's cellar. These Scandinavian countries takes the entire side between the shoulder and the ham, i.e., short middles. These middles are cured in dry salt. In summer the time required for the cellar cure ranges from about 40 to 60 days. Then the

goods are in transit from a typical packinghouse center to a Scandinavian port for 30 to 40 days more, making a total interval of perhaps three months from the time the hogs are killed until the time the goods are available for consumption.

Holland

Holland formerly bought large quantities of neutral (leaf) lard and oleo oils for her margarine factories, but now, on account of the development of the hydrogenation process, Holland uses vegetable fats in large amounts. These fats, such as cocoanut and palm-kernel oil imported from the Dutch East Indies, are deodorized and hydrogenated. Hydrogenation makes them firm. Prior to the bad break in German exchange, which occurred in March of 1922, some fat backs were bought by Dutch traders for shipment into Germany.

Latin European Meat Demand

In normal times Belgium and France provided a large outlet for heavy fat backs and clear bellies, which are not marketable in this country. Some of the Belgians and French utilize those meats by cooking them in a pot with potatoes. Spain, too, was a buyer of fat backs until June, 1921, when a new tariff duty became effective and practically prohibited these importations. Italy normally uses some American lard and fat backs, but at the present time she is leaning principally on her own domestic vegetable fats, such as olive oil. The cures on these dry salt meats for Italy, Spain, and the north African provinces naturally require a longer time, since the meats are destined to be subjected to a higher temperature, and since the cold storage facilities in those countries are not fully adequate.

The character of the central European and Danish trade already has been indicated. Enough has been said about the trade on the Continent to show that there has been a constriction in the outlet for those cuts which constitute the surplus

here; that is, those most difficult to market at home. For this reason, our inability to market many of the fat and heavy cuts at home, pork was sold during the winter, 1921–1922, below parity with the price of live hogs. Some of the cuts held up their values fairly well, but the aggregate returns from the whole carcass was not satisfactory.

How Meat Exports Are Sold

The larger packing companies maintain branch houses abroad. Each of these branch houses receives quotations from its parent company, and exerts its best efforts to sell in accordance with these quotations. Smaller packing companies usually work through brokers, to whom offers are made by cable. These offers are good for acceptance within a stated period. When a broker receives such offers, he canvasses buyers—sometimes by wire, sometimes by telephone, and sometimes in person. He may cover a city, a province, or a state. Sometimes the price quoted to the broker is unobtainable. In that case he may cable back a counter-offer which he has received, and this counter-offer may either be accepted or declined by the company which he represents. Such brokers work on a commission basis. Frequently a large packinghouse will cable quotations by merely giving a price on one weight and grade of a given cut, leaving it to the foreign representative to apply a proper differential to the other cuts and other grades. Thus, if a foreign agent receives a quotation on hams of a certain grade weighing 14 to 16 pounds, he knows the price at which hams of another weight are available.

On occasion an American packer faces the necessity of instructing his foreign agent to take the best price possible for a certain commodity, in order to move it and receive other commodities. He may also instruct his agent to reship some of his supplies. For example, if a large packing company has a big quantity of fat backs in Antwerp and the trade for fat backs there is slow, it may cable its agent in effect: "Send half

your fat backs to Rotterdam and the other half to Marseilles." So-called "small" packinghouses do most of their business at prices agreed on before the goods leave this side of the water. The agreed price includes cost, insurance, and freight, and hence is known as "C.I.F." sale.

Competition and Exchange

Competition in foreign, as well as in domestic markets is quite severe. Some packer may have a surplus of a particular cut. He names a low price. Other packers have to meet it if they wish to sell their stocks. The demand also seems to vary from one cut to another, just as it does at home. In the domestic market in 1922 there was an almost uninterrupted demand for pork tenderloins, whereas the export trade demanded hams in increasing quantities.

Before the war, prices usually were quoted in the currency of the country to which the goods were destined to go. Now all American packers try to sell in terms of dollars—dollars per 112 pounds in the United Kingdom, dollars per 100 kilos on the Continent—in order to avoid the risk of exchange fluctuations. On C.I.F. shipments the time of delivery is specified. "Prompt shipment" is the usual procedure. In the case of the United Kingdom this generally means within ten days from the date of sale; on most of the Continent, within two weeks from the date of sale; and in Scandinavia, within three weeks from the date of sale. The seller must guarantee the weight of the goods on arrival within certain narrow limits. The buyer must weigh them with reasonable promptness.

Careful Currency Calculation

Making an offering by cable is no simple matter for anyone except a well-trained expert trader. Suppose, for example, that an American packer on May 1 cabled to his Liverpool representative, offering a certain number of boxes of Cumberlands of specified weight to be shipped from an American

packinghouse within ten days at a price of so many shillings per English hundredweight. To calculate such an offer, the seller must take the net price F.O.B. his packinghouse, and then must add to it the cost of packing the meat in export boxes, and the freight from Chicago to seaboard and from seaboard to Liverpool. He must also add an insurance charge, based on the sale price plus 10 per cent prospective profit for the buyer. This augmented price must be increased by a sum sufficient to cover shrinkage, the expense of necessary supervision at seaboard when the shipment is transferred from rail to boat, agent's commission, and interest on money during the interval elapsing before funds will be available to the shipper. In summer time icing and re-icing expenses must be figured. When all of these calculations have been made, the price must then be computed in shillings instead of dollars, on the basis of 112 pounds as a unit instead of 100 pounds. When the price is made in shillings, which is not usually the case now, the packer must also consider what he thinks shillings will be worth 10 days from now when he ships the goods, and 40 days from now when he tries to convert the shillings into dollars with which to buy stocks and pay his workmen. On receipt of the cablegram making the proposition, the packer's representative will place the offer before prospective buyers. He may not get the price asked, and he may have to try to get a counter-offer and cable that back to the parent company.

Simplifying Correspondence

Methods of simplifying cable correspondence and of keeping the expense down to the minimum have been worked out with great nicety. Here is an actual example, with a few letters changed for purposes of disguise, of what can be done with a particular packer's cable code: If the American packer wires his foreign agent "Enelataw," and the foreign agent answers "Anelatawik," the exchange means that the packer has said to his agent: "We offer 50 boxes of Cumberlands,

averaging 32 to 36 pounds in weight, for shipment within ten days, at 100 shillings per English hundredweight C.I.F. Liverpool"; and the agent's answer means: "Offer accepted for 50 boxes of Cumberlands, averaging 32 to 36 pounds in weight, for shipment within ten days at 100 shillings per English hundredweight C.I.F. Liverpool, Smith Higgins & Co."

Shipping Arrangements

When the order is finally accepted, the next thing for the packer to do is to make shipping arrangements. This means primarily obtaining reservation on a suitable steamer. It is an advantage, of course, to have space on a large boat plying direct. On a small boat the goods are necessarily stored nearer to the engines and boilers. The heat increases the shrinkage and is otherwise undesirable. After shipping arrangements have been made, it is necessary to provide for the shipment to go forward from the inland point, if the packer is situated in the interior, in time to connect with the steamer. In the case of pickled goods the meats must be drawn from the vats and drained for 48 hours before being packed. As soon as drainage has been completed, the meats are placed in rows or tiers within boxes, and pressure is then applied. A tightly packed box is better able to withstand rough handling. Moreover, the tighter the contents are packed in the box, the less air space there is, and this is an advantage.

It takes practically 50 boxes to make a minimum carload. Therefore, it is desirable to get big orders or consolidate shipments to the seaboard. It is good practice to have a representative at the seaboard to keep in touch with the railroad officials there, in order to make sure that the car is not delayed in transit and to advise the representative of the vessel when the car arrives. When the goods are stored in the ship's hold, a great deal depends on the judgment of the master stevedore with respect to which compartment the meats should occupy. Long before this the shipper probably has got his papers. He

generally obtains a through bill of lading from the port of shipment to the port of destination. Then as soon as he can get the government certificate of inspection, weight sheets, insurance, marine insurance, certificates, and his invoices filled out, all of which are to be attached to the draft on the buyer, he forwards his draft abroad, usually through a bank. In the United Kingdom the draft is made payable at 30 days after sight. A local bank in the foreign country presents the draft to the buyer, who writes "Accepted" across its face, and signs his name and the date. The draft becomes due 30 days later.

Fast Shipments

As a great many of the shipments are made on comparatively fast boats, there is every probability that the meats will arrive before the 30-day period has expired. It is the practice of buyers in the United Kingdom to pay the draft as soon as the goods have arrived, thereby obtaining the bills of lading and authority to obtain possession of the shipment. Goods not removed within a specified number of hours are placed in a warehouse by the steamship company and held there at the risk of the owner. Meats exported from the United States are generally sold to a wholesaler on the other side. He usually processes these meats, which finally find their way into the butcher shops, delicatessen stores, and other media that reach the consumer directly in the foreign countries to which American meat products are exported.

CHAPTER XV

THE UNITED STATES FEDERAL MEAT INSPECTION SERVICE[1]

Inspection the Result of Dressed Beef

The rise and spread of the dressed beef trade brought in its train several results of great and lasting economic benefit. Perhaps the most important of these has been the federal meat inspection service, which was made possible by concentration of slaughtering in large-scale plants with wide distributing facilities.[2]

Meat animals are subject to many diseases which impair or destroy the wholesomeness of their meat as human food, but the presence of the effects of disease are not always discernible in the dressed carcass. A piece of meat may carry the germs of a dangerous disease without giving any indication of this fact to the consumer. To detect disease there should be an expert inspection at the time of slaughter. The natural and logical authority to conduct such inspection is the government, which is the only disinterested party. Private inspection would not receive sufficient confidence for the public to make it a success on a national scale.

To protect the people at a point where they are unable to protect themselves has been, generally speaking, the object of the meat inspection. Diseased meat is the direct cause of disease in those who eat it. The consumer, being himself unable to determine whether or not the meat he buys is diseased,

[1] Of necessity this chapter treats as part of its subject matter the slaughtering methods of the modern packinghouse. Hence a separate chapter on this phase is superfluous.

[2] First Annual Report, United States Bureau of Animal Industry (1884), statement by Edward W. Perry.

demands that he be protected by the government from the cupidity or ignorance of the man from whom he buys.

Historical Periods

Meat inspection in the United States falls naturally into three periods: (1) from the opening of the Union Stock Yards in Chicago in 1865 to the year 1890, when the first federal Meat Inspection Law was passed; (2) from the latter year until the passage of the law of 1906; (3) from then until the present time.

By the year 1851 the packing industry had become firmly established in Chicago, and by 1865 packing had become an important part of the business of Kansas City, St. Louis, Omaha, St. Joseph, and Cincinnati. With the establishment of the Union Stock Yards in Chicago, meat packing was reduced more nearly to a system, and the city health authorities instituted an inspection of the packinghouses. An inspector was stationed at each of the two gates through which the animals passed from the railroad on their way to the stock pens. These health officers were "practical butchers whose experience enabled them readily to detect any cattle or hogs that might be suffering from disease or were not fit for human food."

The first statistics of cattle inspection were compiled in 1881, when out of nearly 2,000,000 cattle inspected for slaughter in Chicago, 515 were found to be diseased. In 1870 United States Commissioner of Agriculture Horace Capron saw the danger that menaced the public from eating unwholesome meats. In urging the establishment of a division of veterinary surgery in the Department of Agriculture, he wrote:

> The value of stock lost annually from disease is enormous and threatens not only to decimate our animals, but to expose the human family to disease from the consumption of unwholesome meats.

Packers Aid Inspection

In September, 1882, a number of articles appeared in Chicago newspapers, declaring that numbers of diseased animals were taken from the stockyards and slaughtered for food for human beings. The articles were very graphic in their description of scenes in the slaughter houses and stockyards and were copied widely in the eastern states, as well as in Europe. Although it was explicitly stated that great care was used by canners and by shippers of dressed beef to prevent the slaughter for their use of animals unfit for food, the effect of those articles was damaging to the interests mentioned.

The principal packers and shippers of beef at once exerted themselves to assist the city health authorities of Chicago in their efforts to prevent the sale of any animal suffering from disease or from injuries that made the flesh unfit to eat. The department of health had authority for this purpose over the entire area within a line one mile outside of the limits of the city. An inspector was stationed at each slaughter house, and one was constantly on duty at the stockyards during the hours when the gates of the yards were open for the passage of stock. The officers scrutinized the animals offered for sale, especially those destined to be slaughtered in Chicago. If an animal exhibited indications of a disease making the flesh unsuitable for food, it was ordered sent directly to an establishment where the carcass might be converted into fertilizer. Employees of the canning companies and of shippers of dressed beef reported to their principals or to the inspectors the presence in the market of any diseased animal, and condemnation quickly followed.

Inspectors were also stationed at the wholesale markets to examine the meats offered for sale. When the meat was condemned, kerosene was poured over it.

Edward W. Perry, Special Agent for the Bureau of Animal Industry, after investigating conditions at Chicago, wrote as follows:

> These facts seem to warrant the assertion that the meat supply of Chicago is practically entirely wholesome. Self-interest leads the packers and canners to use every available means for preventing even the shadow of suspicion resting upon the goods they have to sell; hence they have become most effective aids to the health department, which has given proof of efficiency in this branch of its work.

Foreign Prohibition of United States Meats

It is clear that inspection by city health authorities and by the packers themselves prevailed in the Union Stock Yards in Chicago and in the slaughter houses of other cities for a number of years prior to 1881, and it is probable that a more or less efficient inspection was practiced from the beginning of the meat packing business. That this inspection was not satisfactory to some foreign governments, however, was shortly to be shown by the action of several nations in placing restrictions upon American exported meats, and finally in prohibiting them entirely. The decrees against American meats were considered unjust, for the general physical condition of the animals in this country was better than in other countries, and it was generally accepted by stock raisers and meat packers that the prohibition was for the purpose of preventing competition.

Restrictions began with pork products, Italy being the first country to issue a decree, in 1879. She was followed by Hungary a few months later, Spain and Germany in 1880, France, Turkey, and Roumania in 1881, Greece in 1883, and Denmark in 1888. The reason assigned by these countries for prohibiting the entry of pork was the alleged presence of trichinae and the impracticability of a sufficiently thorough microscopic examination to guarantee that the meat was not affected. Following the passage by Congress of the law of 1891, and the commencement of microscopic inspection of pork, Germany, Denmark, Italy, France, Austria-Hungary, and Spain modified their regulations so as to admit hog products, if they were certified to be free from trichinae.

In the latter part of 1894 various states in Germany and the countries of Denmark, Belgium, and France prohibited the importation of cattle from the United States, giving as a reason the prevalence of Texas fever, pleuro-pneumonia, etc. Since 1870, Great Britain has required that American cattle shall be slaughtered immediately upon arrival. This restriction was brought about by the alleged existence of pleuro-pneumonia in the United States.

United States Meat Found Good

Following the prohibition of American pork by Germany and other countries, the Department of State in March, 1881, investigated various phases of the pork industry in the western states, covering all possible causes which could render the products dangerous to health. In October, 1883, President Arthur appointed a commission of impartial scientists and representatives of the New York Chamber of Commerce and the Chicago Board of Trade, instructing the Commission "to make a searching examination on the spot of all the conditions of the hog-raising and pork-packing industries in the United States, and to follow by the most practical examination the course of this food staple from the fields and farms of the United States to the wharves where it is shipped or to the shop, where it is exposed for sale and domestic consumption."

The result of these investigations was communicated to Congress by the President, accompanied by much diplomatic correspondence and other information bearing on the subject. While it was conceded that trichinosis was found in American hogs, the proportion of animals thus affected was declared to be less than in Europe.

In 1885 Commissioner Norman J. Colman urged upon Congress the importance of vigorous means and measures to protect American cattle interests, because of the existence of pleuro-pneumonia and other contagious diseases which were having a very serious effect upon foreign and interstate com-

merce in livestock. Since the foreign restrictions had been enforced, the exportation of sheep had steadily declined from 108,652 in 1879, to 32,410 in 1884, and that of hogs from 25,033 in 1879, to almost none in 1884. The restrictions upon interstate commerce from the same cause also had been a great burden, and the reduction in the value of cattle in the affected states had been enormous.

First Federal Law

In 1889 Secretary of Agriculture J. M. Rusk, in his annual report made an earnest appeal for legislation which would provide for a federal meat inspection law. While Secretary Rusk repudiated the "captious objections" on the part of foreign authorities to the wholesomeness of our meat products, he added that as long as the government neglected to take precautions universally adopted by the governments of those countries in which a market was sought for surplus products, and left it to the officials of other countries to inspect American live cattle or meats, it was impossible to present as forcible arguments as could be made against restrictions on United States trade. This was especially true when foreign countries could claim with some show of reason, that they had better opportunities for learning of diseases among American cattle than were enjoyed by the American government itself.

The following year, August, 1890, Congress took the first step toward the establishment of federal meat inspection by the passage of a law "providing for an inspection of meats for exportation." This act provided for a careful examination of salted pork and bacon intended for exportation, to determine whether it was wholesome and fit for food, when the laws, regulations, or orders of any foreign government required inspection, or when any buyers, seller, or exporter of such meats requested inspection; and also for the examination of all cattle and sheep for export. Such inspection, it was provided, should be made at the place where the meats were packed

or boxed, and the meats should be stamped or marked after inspection. The examiners were authorized to issue certificates of inspection to the shipper of the meat and to the consignee and also for the Department of Agriculture.

Primarily, therefore, meat inspection by the federal government was begun in the United States, not because Congress had in view the protection of the people of this country from the result of eating diseased meats, but because foreign countries were opposed to allowing American meats to enter their ports for the alleged fear that the people of those countries would suffer therefrom.

Government Inspection Best

Although inspection for export was desirable, the view of Congress was not true as to facts, because it allowed room for a wrong conception that packers would be short-sighted enough to sell poor meats consciously, which policy would in a short time have decreased their business. Bad meats, such as occasionally got into trade channels, were due to accidents. The attitude of Congress was natural, however, at a time when the functions of government were being extended rapidly in many departments. There was failure to realize in entering upon the function of meat inspection that there could not be any other kind of authoritative inspection, and that this would have been a natural and a good thing from the start.

Under the law of August 30, 1890, the United States Bureau of Animal Industry prescribed regulations which required all packers, or exporters, buyers, or sellers of such meats to make application in writing to the Secretary of Agriculture for inspection. Every inspected package of salted pork or bacon was required to be stamped, if found wholesome and fit for human food. Certificates of inspection were issued to the exporters, the consignee, and the Department of Agriculture. Inspectors were required to report daily the number of stamps issued.

It soon became apparent, however, that the law did not meet all conditions. It was the intention of Congress in passing this measure to enact a law which would enable the government so to certify to the wholesomeness of American pork products as to entitle them to entry into foreign countries. The act, however, did not provide for determining the fundamental question as to whether or not the animals from which they came were diseased at the time of slaughter. The consequence was that foreign governments refused to recognize such inspection certificates issued under this act as sufficient to warrant the removal of the prohibition which they had maintained.

Ante- and Post-Mortem Inspection

To remedy this situation Congress passed the Act of March 3, 1891, which provided that the Secretary of Agriculture should cause an inspection to be made, prior to the slaughter, of all cattle, sheep, and hogs which were the subject of interstate commerce and which were about to be slaughtered at slaughter houses, canning, salting, packing or rendering establishments in any state or territory the carcasses or products of which were to be transported or sold for human consumption in any other state or territory. In addition it was provided that:

> There may be in all cases where the Secretary of Agriculture may deem it necessary or expedient a post-mortem examination of the carcasses of all cattle, sheep and hogs about to be prepared for human consumption at any slaughterhouse, canning, salting, packing, or rendering establishment in any State or Territory, or the District of Columbia, which are the subjects of interstate commerce.

It should be unlawful further for any person to transport from one state or territory to another, the carcasses of any cattle, sheep, or swine, or the food products thereof, which had been examined in accordance with the law and found by the inspector to be unsound and diseased. Cattle, sheep, and swine slaughtered by any farmer upon his farm and trans-

ported from one state or territory to another were exempted from the operations of this law except in case the carcasses of such cattle, sheep, or swine went to any packinghouse or canning establishment and were intended for transportation to another state or territory, in which case they were subject to a post-mortem examination.

The regulations issued under this act provided for an examination before and after slaughter by veterinary surgeons of all animals slaughtered for export or interstate trade, the condemnation of all animals found to be diseased, and the proper identification of all carcasses and other products entering into these two classes of commerce.

Microscopic Pork Inspection

The regulations also provided for a microscopic examination of hogs after slaughter in order to certify that they were free from trichinae, as Germany and other countries had prohibited such meats on the grounds that they were so affected. When the slaughtered hog was passed into the cooling room the veterinary inspector or his assistant took from each hog carcass three samples of muscle, one from the pillar of the diaphragm, one from the tenderloin, and the other from the shoulder. These samples were put into a tin box and a numbered tag placed upon the hog and a duplicate number on the box containing the samples. They were then taken to the microscopist, who made a thorough examination of each sample, furnishing a written report to the inspector in charge of the killing room. All hogs reported as affected with trichinae were at once removed under the supervision of an inspector from the cooling room and disposed of by tanking or by thoroughly cooking.

First Inspection in New York

The first inspection under these regulations was in New York City at the abattoir of Eastman and Company, May 12,

1891, and was confined to the inspection of their export dressed beef. At the beginning of June, 1891, the work was inaugurated in Chicago, and soon thereafter at South Omaha, Nebraska; Kansas City, Missouri; Milwaukee, Wisconsin; Jersey City, New Jersey; and Hammond, Indiana. The microscopic examination of hogs was commenced at the abattoirs of Nelson Morris and Company, Armour and Company, and Swift and Company at Chicago on June 22, 1891.

The result of this microscopic examination of hogs was an order by the German government on September 3, 1891, removing the prohibition that it had maintained since 1880 against the importation of American pork products. The removal of this prohibition by Germany was followed within a short time by the removal of a similar prohibition by Denmark and later by Italy, France, and Austria. The extent of the inspection service in its beginning is indicated by the fact that in the first full year following the institution of federal meat inspection (the fiscal year ending June 30, 1892), 5,076,929 animals were inspected, of which 3,167,150 were cattle, 59,089 were calves, 1,267,329 were hogs, and 583,361 were sheep. The cost of inspection was from 5½ to 6 cents per carcass and the total expense of the meat inspection service, $279,508.

The benefits arising from meat inspection, as carried on under the law of 1891, made it apparent that the inspection could be extended with profit. Secretary Rusk in his report pointed out the need of extending the inspection to cover all animals slaughtered for human food, in order, first, to secure to the American consumers most healthful meats, and also to maintain the reputation of American meat products abroad.

Growth of Meat Inspection

By 1894 meat inspection had grown into the most important and extensive part of the work of the Bureau of Animal Industry. The ante-mortem and post-mortem examinations were extended to hogs at the various abattoirs where inspection

had been established, thus greatly increasing the scope of this service. In that year inspection was carried on at 46 abattoirs in 17 cities, whereas in the first year of meat inspection but 22 abattoirs had inspection.

Dr. E. E. Salmon, Chief of the Bureau of Animal Industry, in his report in 1895, suggested that the states provide an efficient method of co-operation by enacting legislation making it illegal to sell for human consumption within each state any meat from animals condemned by federal inspectors, unless the animals were held a sufficient time before slaughter to enable them to recover and become fit food products. This would render unnecessary state meat inspection service at abattoirs which had federal inspection. Such co-operation would make for efficiency.

It was urged that Congress should give the Bureau more and wider power to administer the meat inspection service in supervising the use to which condemned meat could be put legitimately, such as in the manufacture of inedible products, and it was also urged that the operation of an abattoir in the absence of an inspector be prohibited, and that abattoirs should not be opened on Sunday. The managers of some of them at that time and afterwards showed a disposition to kill animals at night, or very early in the morning, or on Sunday without notifying the inspector.

Interstate Commerce Regulations

The Act of Congress of March 2, 1895, amended the Act of March 3, 1891, so as to confer power upon the Secretary of Agriculture to make such rules and regulations as he deemed necessary to prevent the transportation from one state or territory to another, or to any foreign country, of the condemned carcasses or parts of carcasses of cattle, sheep, or swine which had been inspected in accordance with the provision of the law. There was no further enlargement of the Department's and Bureau's powers until 1906, although the

officials recognized their limitations and attempted by recommendations that appear in successive reports, as well as through quiet work of which no record is preserved, to secure legislation that would remedy the lack of jurisdiction.

Although neither the law of 1891 nor the amendment of 1895 mentioned sanitation specifically, the Department in February, 1906, issued a rule demanding greater cleanliness in all parts of the packinghouses and the installation of regular toilet rooms. Progress was being made in this line when the agitation of 1906, considered in another chapter, directed public attention to the inadequacy of laws on the subject and brought about the enactment of the law of June 30, 1906. The so-called "revelations" of that year, however, were in some respects exaggerated and incorrect, but such defects and limitations of the laws under which the inspection had been conducted as existed up to that time were thoroughly realized by the Department. Several efforts had been made to procure new legislation and increase appropriations in order to extend the inspection and improve its efficiency. The disclosures of unsatisfactory conditions in the packing industry in 1906 related almost wholly to canned and prepared meats, the use of preservatives, and the unsanitary condition and methods of many packing establishments. These, however, were matters over which the Department, up to that time, had no control.

Meat Inspection Act of 1906

The Meat Inspection Act of 1906 took effect on July 1 of that year, except that the provisions regarding the transportation of meats did not go into effect until October 1. It conferred upon the Secretary of Agriculture greater power and increased from $800,000 a year and made permanent an annual appropriation of $3,000,000 to pay the cost of inspection, enabling the Department to extend and strengthen greatly the inspection service.[8]

[8] Previous to this the annual expense for inspection was $800,000.

Under this law the inspection was applied not only to the live animals before slaughter and to the carcasses immediately after slaughter, as was the case under the former law, but afterwards to the meats and meat food products in all the stages and processes of preparation, curing, canning, etc. The Department of Agriculture was empowered further to require sanitary equipment, conditions and methods in the slaughtering and packing establishments, to prevent the use of harmful chemicals and preservatives and of misleading labels, and to regulate the transportation of meat in interstate and foreign commerce. This law applied only to cattle, hogs, sheep, and goats, and to the carcasses and meat food products of these animals. Poultry, fish, and game were not subject to inspection.

Installing Inspection

Meat inspection under this law proceeds by logical steps. Meats or meat food products, except those of farmers, retail butchers, and retail dealers, cannot be shipped from one state to another or abroad unless they bear the official meat inspection marks. A person or firm desiring to make such shipments must, therefore, make application to the Department for inspection, stating the extent and character of the business expected to be done. The Department, as directed by the law, sends its experts in sanitation who report to Washington with recommendations.

Usually changes are required in sanitation or in facilities for conducting inspection. The Department points out necessary changes, and its requirements are in accordance with broad and well-known principles. It requires that each room used in the ordinary processes be well lighted and ventilated; that ceilings, walls, and floors be of such material as can be easily cleaned; that toilet and dressing rooms sufficient in number and ample in size be provided and be fitted with modern lavatory equipment, including running water, soap, and towels.

Such rooms must be properly ventilated and lighted and be entirely separate from the compartments where carcasses are dressed or meat handled.

The premises about the plant and belonging to it also come in for attention. The yards, pens, alleys, and chutes must be clean, and the former common practice of fattening hogs or other animals on the refuse of the slaughter houses is forbidden. When reports show that the packer has put his plant in proper condition, the Bureau assigns an official number to the establishment, details a sufficient number of inspectors to conduct the inspection, and business may proceed.

Cleanliness a Requisite

This, however, is not all there is to the sanitation required by law. A slaughter house gets dirty with great rapidity; like a small boy, it requires constant cleansing. It is necessary that ceilings and walls be frequently scrubbed and whitewashed or painted, and that trucks, trays, and other receptacles, chutes, platforms, racks, tables, and all tools used in moving, handling, chuting, chopping, mixing, canning, or other processes be thoroughly cleaned each day. The employment of anyone who has tuberculosis or other communicable disease is forbidden. Clothing which comes in contact with the meat should be of a material that is readily laundered, and it should be cleansed each day. Many of the larger packers have established laundries and provide their workmen with fresh outerclothing daily. Personal cleanliness on the part of the workmen is insisted upon, and to such an extent is this carried that some establishments employ professional manicures who daily treat the hands of the girls handling such products as chipped beef.

In this matter of cleanliness and sanitation many of the packers throughout the country had been proceeding with improvements as a part of their regular business. For they had found out that nothing enters into competition in the pack-

ing business more than does sanitation. Accordingly, packers, in order to get ahead of their competitors, improved sanitary conditions. The government furthered this and set standards of general application.

Actual Inspection Procedure

As conducted at present, the first step in actual inspection is the examination of the living animal by government inspectors in the stockyards or in the pens and alleys of the packing company by which the animals have been brought and in the slaughter house of which they are to be slaughtered. No animals which have not undergone this examination are allowed to enter the slaughter house proper.

The inspector goes into one of these pens containing anywhere from 100 to 200 animals and looks over each one carefully. When he finds one that to his mind is not perfectly sound and healthy he, or his assistant, affixes to its ear a numbered metal tag bearing the words "U. S. Suspect." Such animals are segregated and slaughtered separately from other animals, either before or after the regular course of the killing. If the post-mortem examination does not confirm the inspector's suspicions, and no lesions of disease are found, the tag is taken off and sent to the office of the inspector in charge of the station, who had already been informed of the number of the tag after it was affixed on suspicion, and the carcass is sent along as edible meat. If lesions which warrant condemnation are found, the carcass is sent to the tank, the tag being removed and taken with a report to the office.

"Knocking Cattle"

Animals which have been found by the inspector to be sound and healthy on the ante-mortem inspection are not marked, but proceed by runways into the slaughter house itself and to the killing floor, which for cattle is usually at the

top of the building.[4] The cattle go into narrow enclosures, called "knocking pens," from one to five to a pen. The knocker walks on a platform above and with a long-handled hammer shaped like a riveting hammer strikes the animal on the head. As it falls stunned the side of the pen opens, but the door of the pen is only opened far enough so that the tilting of the floor will slide the animal's legs through the opening for shackling. After the shackling has been done the door is opened entirely and the floor tilted completely to make the animal roll out on the dressing floor, or "killing beds," a foot or so below. The animal is then hoisted and hung from the rail of an overhead traveler.

In this position the sticker bleeds him by a longitudinal incision that severs the principal blood vessels in the neck. When the blood is used for food purposes it is caught in a numbered receptacle and held until the carcass is further examined. The overhead traveler now carries the animal forward, and workmen skin the head and cut it off, placing it on a rack and marking it so that it can be identified, should cause for condemnation be found elsewhere in the carcass.

A string of butchers now follow each other in rapid succession. The "leggers" remove the hind legs at the hoof and the forelegs at the knee. The "sider" skins the animal down as far as he can work toward the floor. The "caul puller" cuts the carcass from throat to anus, removing the caul fat from the abdomen and placing it in a box, which is numbered for identification. Another butcher loosens the trachea and saws through the sternum. Still another butcher skins the buttocks and usually cuts off the tail, which is also marked for future identification.

The carcass is now hoisted clear of the floor and the "backer" finishes the skinning. At the same time the "gutter" is at work removing the viscera. The rump sawyer then takes

[4] This description applies especially to the typical large establishment with modern equipment. While methods and details may vary in the smaller houses the inspection is carried out on substantially the same principles.

the eviscerated carcass and divides it from the coccyx to the lumbar vertebrae. The "splitter" follows with his cleaver and continues the splitting to the base of the neck. The neck man or hide dropper finishes cutting the hide from the neck, after which another butcher splits the cervical vertebrae, thus separating the halves. Trimmers then cut off the ragged pieces of flesh, remove the spinal cord, and pump the blood out of the forequarters by rapidly moving the forelegs up and down.

Looking for Infection

On severing the head the glands are first exposed and as these are common seats of tubercular infection, a federal inspector makes an examination for evidence of disease, if necessary cutting into the glands himself. Another inspector stands at the elbow of the gutter and as the viscera are revealed, watches with practiced eye for abnormalities, carefully examining and handling the various parts in order that any obscure indication of disease may be discovered. The law requires this inspector to handle the viscera, and if necessary, to cut into them. This is rapid as well as exacting work, and the head and viscera inspectors frequently exchange places, or the viscera inspector is relieved by another after two hours' work.

When the inspector finds a diseased carcass he attaches to it by means of a wire and seal a paper tag with the words "U. S. Retained" on it and numbered to correspond with the number on the stub from which it is taken. He sends the numbered stub to the office with his report. The carcass, with the parts that have been separated, none of which is allowed to lose its identity, is now sent directly to a compartment called the "retaining room." This important room must be rat proof, well lighted, have floors of cement, or of metal or brick laid in cement, and be provided with facilities for locking. There is a special lock for the room, and the keys remain in the custody of the inspector. At convenient periods the

retained carcasses undergo in this room at the hands of other inspectors a more leisurely and careful inspection.

Final Inspection

This is the final step in the post-mortem examination. The inspectors here have a good deal of personal discretion. Certain definite rules are laid down by the Bureau, but something must be left to the judgment of the inspectors. They must pass upon the question of the extent of the affection and decide whether or not the whole carcass or only parts of it should go to the tank. Not being pushed by the exigencies of the rapid work on the killing beds and the necessity of keeping up with the never-ending stream of carcasses, they are deliberate and careful in making their examinations and in forming their judgments. Carcasses which they decide to be fit for food, they permit to be removed and placed with other healthy carcasses, which have been passed on the first inspection. They take off the "U. S. Retained" tag, return it with their report to the office, and stamp it "U. S. Inspected and Passed."

When the examination confirms the suspicious indications of the first examination, however, they stamp conspicuously on the carcass, also on the tag, the words "U. S. Inspected and Condemned." The carcass is removed immediately from the retaining room under the eye of a government employee and goes either to the tank, or, if it is not convenient to tank it immediately, to the condemned meat room. This, like the retaining room, is provided with a lock, the key of which is kept by a government employee, and which is opened only by government employees. As soon as practicable, government men remove the carcass to the tank, keeping a record of the tag numbers, which they forward with their reports to the office. At houses which do not provide a "condemned room" the carcass is sent directly to the tank. About 25 per cent of the carcasses retained are condemned.

All carcasses, both fit and unfit, having been removed from

the retaining room, the floors and walls are washed with hot water and disinfected in order that the room may be clean and free from disease infection for the reception of the next batch of retained carcasses.

To return to the killing floor and to the carcasses with which the inspectors have found nothing unhealthy, the overhead traveler carries the separated halves along out of the way of the other operations, and other workmen subject them to a thorough washing with very hot water, usually from a hose, or from an ingenious combination of hose, pipe, and brush, and wipe them dry with clean towels. During this process the hanging halves slowly approach the chill room over a mechanical conveyor.

"The Little Purple Stamp"

Just before entering the chill room the halves are marked with the inspection legend in five places or more on each side of beef, usually on the loin, rib, chuck, plate, and round. The marking is done by means of a metal or rubber stamp and a purple indelible ink, and the words thus stamped are "U. S. Inspected and Passed," or an abbreviation of these words, with the establishment number. The number is one assigned to the house by the Department at the time inspection is begun. It is registered in the Department records, and besides serving as a convenient means of reference it provides a sure method of tracing meat about which questions may subsequently arise.

This mark is absolutely necessary under the law to procure the movement of the meats between states, for the law forbids carriers to transport from one state to another any meats that are not so marked, except the meats of farmers and of retail butchers and dealers. The federal law does not, and of course, cannot, forbid the carrying of unmarked meats inside of a state, so that in the absence of state laws the carriers may, unmolested, carry any kinds of meat from one part of a state to another.

The sides now pass to the chill room, where they are held at a temperature of about 36 degrees Fahrenheit, for 48 hours or more before being shipped out. The head, tail, caul, and liver are removed to other parts of the plant. On modernly appointed killing floors the offal or "fancy meats," as it is now called in the trade, is removed by means of chutes. During the entire process of slaughter the meat has not been allowed to touch the floor. When the inspector has detected disease in a carcass and attached the "Retained" tag to it, he orders the butchers, before they proceed to another carcass, to cleanse their hands of all grease and to immerse them in a disinfectant solution, usually bichloride of mercury, 1 to 1,000. He sees that all tools and implements used in the suspected carcass are likewise cleaned of grease and immersed in boiling water or in a disinfectant solution. For this purpose disinfecting tanks are now in general use, provided with three compartments, one of hot water to take off the grease, a second with the bichloride of mercury solution, and a third with hot water for final rinsing.

The slaughter of calves, sheep, and goats, follows generally the plan for cattle, sheep often being killed at one end of the beef killing floors.

Hog Slaughtering

The slaughter of hogs, however, is entirely separate and the processes are different. In the larger houses where 300 to 500 hogs are killed in an hour the slaughtering proceeds as follows:

A group of hogs is herded in a pen, through one side of which revolves a huge wheel or hog hoist with stout hooks set near the outer rim. Men go into the pen and deftly attach the loop of a chain to a hind leg of the hog and hang the other end of the chain to a hook on the wheel. The hoist slowly elevates the animal, and at the top the chain automatically passes to an inclined rail. The hog hanging head down,

Figure 18. United States Inspected and Passed Beef

passes to a sticker, who at one stroke severs the larger blood vessels of the neck.

When the animal is dead the carcass is dropped into a great vat of scalding water, where it is poled from one end to the other. Long finger-shaped hooks then lift the body and pass it on to an automatic scraping machine, known as a "dehairer," which speedily removes most of the hair. Emerging from this, the carcass drops onto a moving platform, which carries it before a butcher, who almost severs the head, exposing the cervical glands, where about 93 per cent of the cases of tuberculosis are detected.

Gland Inspection

Beside the butcher stands a government inspector, who examines the glands, feels them, and, if necessary, cuts further with his own knife. Quick and accurate work is demanded here. If he detects disease he marks the carcass, sometimes with a black cross on the fore quarter, sometimes by severing the ligaments of the foreleg. Beside him is a pail of disinfecting solution into which he thrusts his knife before the next hog reaches him.

The animal thus marked passes on with the others, gambrel sticks are affixed, and the carcasses are hung on the overhead rail and subjected to washing and further scraping. Here the marked hogs leave their fellows. A government employee switches them to another rail, attaches the "U. S. Retained" tag, and sends them along to the retaining room. Those carcasses, the head examination of which has shown no disease, pass on the regular rails to the gutters, who disembowel them. The carcass and the viscera of each animal pass before another skilled inspector, who has to sit close to his work and handle each set of viscera for evidence of disease. This found, he tags the carcass "Retained" and it is switched to the retaining room, the viscera likewise being tagged and sent with the carcass.

The carcasses which have thus far passed the head and visceral inspections and have shown no sign of disease proceed along the rail and are split in halves. Inspectors examine the freshly cut halves, and sometimes find lesions in the bones or muscles, in which case also the carcass is marked for the retaining room. The process from this point to the finishing of the carcass is the same as that detailed for cattle. The untagged animals are allowed to pass through the shower bath, are labeled, and go to the cooling rooms, while inspectors make a closer examination in the retaining room of those carcasses which have been held as suspicious and determine whether they should be allowed to pass unconditionally, be made into lard, or be sent to the offal tank.

Two Post-Mortem Examinations

Briefly contrasting the two separate post-mortem examinations—that on the killing floors and that in the retaining room—it is noted that the floor inspectors have a very limited discretion. Their orders are to hold any carcass that shows the minutest lesions of disease. The business of both the head and viscera inspectors is to find the disease and to stop the carcass then and there for a further inquiry. Once disease is found, or something that looks to the inspector like disease, the carcass must be retained.

On the other hand, the inspectors in the retaining room take their time. It is their duty to examine into the extent of the disease, and in the light of modern knowledge, to judge whether it is local or general, whether or not it unfits the meat for human food, and whether or not the fat may be allowed to be rendered into lard at a prescribed temperature.

The Department provides a sufficient number of inspectors for this work and insists that they be furnished every facility in the way of space and light. Here, as elsewhere, it seeks to accommodate its inspection to the business of the owner of the abattoir. Within reason it requires its men to work as long

as the plant is operating, to begin as early, and to continue as late. The inspectors work as fast as the improved appliances of the establishment permit or as its needs demand, and the Bureau does not require the proprietor to stop his work to send for the inspector or to wait while the inspector returns to his office and makes out an elaborate report—a procedure which is common in the inspection systems of some foreign countries. It requires only that notice be given of the hour that work is to begin, and its men are on hand. In short, the Bureau of Animal Industry specializes in its inspection service, and is as modern and as up to date as the well-organized business it supervises.

At this point—with the killing of the animal—previous meat inspection laws practically stopped. The Department formerly contented itself with placing labels on canned goods, stating that the meat was from animals healthy at the time of killing.

Inspectors in All Departments

The present law, however, goes further, and inspectors are on duty in the other departments of the meat packing plants, and all meats in further process have to carry the marks indicating previous satisfactory inspection. This applies to curing, pickling, smoking, cooking, canning, or the manufacture of sausage. These inspectors having satisfied themselves that the meats have been passed, make another careful examination to assure themselves that the meats have not spoiled, or become unclean since the inspection at the time of slaughter. Such as have undergone changes that make them unfit for food they reject, obliterate the inspection mark and destroy. They then supervise the entire preparation, and require all fixtures and appliances, such as tables, trucks, trays, vats, machines, implements, cans, or containers, of any kind, to be clean and kept clean.

The inspectors also insist that no drugs, chemicals, or col-

oring matters be used, and no preservatives except salt, sugar, vinegar, wood smoke, and other specified ones.[5] An exception is made in the preservative line, in accordance with the meat inspection law, however, to the extent of allowing a manufacturer to pack export meats in accordance with the directions of the foreign purchaser when the use of such preservatives as he prescribes does not violate the laws of the country to which the meat is to be exported. For example, England made no objection to the use of borax; consequently meats sent to England may be preserved with borax, but they must be prepared in separate rooms and marked with special labels showing that they are for export only.

Canned Meat Inspection

The preparation of the immense output of canned meats is supervised in the same manner. Inspectors are present at all the processes between the arrival of the meat and shipment of the canned product, and making certain purity and fitness in the materials and cleanliness in workers, workrooms, and utensils. As a further safeguard the Department has equipped and maintained branch laboratories at the points of greatest output. Here, with microscopes and reagents, special experts examine the salt, the spices, the pickling fluids, and the fats and oils used, with a view to detecting any forbidden preservatives and coloring matters. In short, they bring to the aid of the inspectors the best efforts of modern bacteriological and chemical science. Samples of the finished product are taken at random from stocks, and are even purchased from retailers at distant points. Even the water used, not only here but also in washing carcasses, must pass analytic scrutiny; and several houses accustomed to drawing their supply from contaminated sources have had to abandon the practice.

Having inspected the meat "from the pasture to the package," the inspectors go a step further, and see that the package

[5] These are allowed after a full investigation to determine whether they are lawful.

is properly and honestly labeled. The law carefully regulates the trade labels that go on the packages, and the Department lays down the broad rule that the label shall tell what is in the package. It has been usual, for instance, to label many mixtures as "potted ham" or "potted tongue" or "deviled" or "minced" ham or tongue. At present, if these labels appear, the can must contain only ham or tongue. Some hams used to be labeled "Westphalia ham," or "York ham," the inference being that it came from Westphalia, Germany, or York, England, localities famous for their ham products. These hams now appear as "Westphalia style," or "York style," or "York cut" hams. Packages now labeled "pure lard" must be made of sweet, clean, clear hog fat, with the addition of not more than 5 per cent of lard stearin, in order that the lard may not easily melt in hot weather, and "kettle-rendered lard" must be actually so rendered.

Unfit Carcasses Destroyed

The Meat Inspection Act orders the Secretary of Agriculture to destroy for food purposes all carcasses or parts which are found unfit for food. All large establishments provide tanks for this purpose, because in this way grease may be saved for soap and other non-edible products, including fertilizers. Tanks vary in size with the size of the establishment and its volume of business. They are of metal and extend through two or more floors of the plant. From the nature of their usage they must be very strong and tight.

Government employees first seal the lower opening of the tank. They then see that condemned carcasses, parts, and meat products are put in, along with offal or coloring matter. They close and seal the top, closing and sealing the draw-off valves, have the steam turned into the tank, and require it to be maintained at a certain pressure, usually 40 pounds, for a prescribed time. This produces a temperature of 280 degrees F., which is maintained for 8 or 10 hours, and is sufficient to

liberate all of the grease and even to disintegrate the bones.

Inspectors watch also the drawing off, which is done by means of valves, located at intervals along the sides of the tank, and they mark the containers in which the product is stored and shipped with the word "inedible." All possible precautions are taken to prevent this grease, some of which looks about as good as some lard, from going into trade as edible product.

Inspection Law Stringent

Thus the meat inspection law is an advanced and stringent measure, and the regulations of the Secretary of Agriculture made under it more fully carry out the intent of the law. Other safeguards are also stipulated. The law provides for a fine of not less than $5,000 and imprisonment for at least a year for any man who gives anything of value, even a piece of meat, to a government employee to influence him in the performance of his duties. Regarding such employees it holds over them the menace of similar fine and imprisonment if they accept anything of value, no matter what the intent of the donor or the purpose of the gift may be.

The Bureau further places obstacles in the way of collusion between inspector and owner by frequent changes at the larger stations of employees from plant to plant, and by changes less frequent, of employees from station to station. It is working constantly, also, to secure uniformity in the inspection of all stations, by a complex system of reports, which its experts scrutinize with a view to discovering abnormalities in results and making the proper corrections.

The personnel of the meat inspection service is divided into two general classes: professional and non-professional. The professional is composed of veterinary inspectors, laboratory inspectors, and architect, and a sanitary engineer. The non-professional consists of employees designated "lay" inspectors. The veterinarians must be graduates of accredited veterinary

colleges and must pass the civil service examination for the position of veterinary inspector in the service. At each meat inspection station an inspector is selected to take charge of the work. He reports directly to the Chief of the Bureau of Animal Industry. At stations where slaughtering is conducted only veterinary inspectors are placed in charge, who look after or supervise the regular ante-mortem and post-mortem inspections and perform all of the final post-mortem inspections or examinations. The laboratory inspectors are chemists and also must pass an examination in accordance with the civil service requirements. They make the laboratory tests and inspections.

Lay Inspectors

The lay inspectors are designated lay inspector, grade 2, and lay inspector, grade 1; they are also required to pass the civil service examination. Lay inspectors, grade 2, are experienced and well informed in regard to packinghouse operations; they supervise the curing, preparation, and marking of meats and products. They are trained in passing on meats and products as to soundness, and they conduct the inspection and reinspection of such meats and products.

The lay inspectors, grade 1, are required to have at least three years' experience in handling food-producing animals before taking the civil service examination. Their duties are to assist the veterinary inspectors in the ante-mortem and post-mortem inspections, and to perform other duties similar to those described for the lay inspectors, grade 2. After a certain period of service they are eligible for examination for promotion to the position of lay inspector, grade 2. It is the duty of every employee, whether veterinary inspector or lay inspector of either grade, to see that the sanitary regulations are observed in their respective departments.

Certain veterinary inspectors, selected for their experience and general qualifications, are known as "traveling" veterinary

inspectors. They inspect the official stations and establishments in their respective territories and report to the chief of the Bureau whether the regulations and instructions governing meat inspection are properly observed. Their visits are unannounced and their reports are valuable in the effort to secure a uniform inspection and the enforcement of the sanitary regulations.

The personnel at present consists in round numbers of 800 veterinary inspectors; 1,000 lay inspectors, grade 2; 700 lay inspectors, grade 1; and laboratory inspectors, administrative officers, and clerical forces to bring the total to about 2,650 persons.

Economic Importance of Inspection

The economic importance of the federal inspection of meats and meat food products may be summed up as follows:

It is the instrument by which an important part of the export commerce of the United States has been secured and preserved.

It is a service in hygiene and sanitation of incalculable value to the country at large.

It is the most thoroughly equipped agency through which may be gathered the data necessary to the success of any broad program having for its object the conservation of the national meat food supply through the eradication of damaging and destructive diseases from the food animal herds of the country.

As showing that the federal inspection of meats is a service in hygiene and sanitation of incalculable value to the country at large, and that this service is performed at an extremely low cost, the following facts and figures are cited:

The government maintained inspectors in 892 establishments in 265 cities and towns in 1921. Inspection was inaugurated at 62 plants and withdrawn from 61 during the year. It was discontinued at 47 of them because of the stopping of

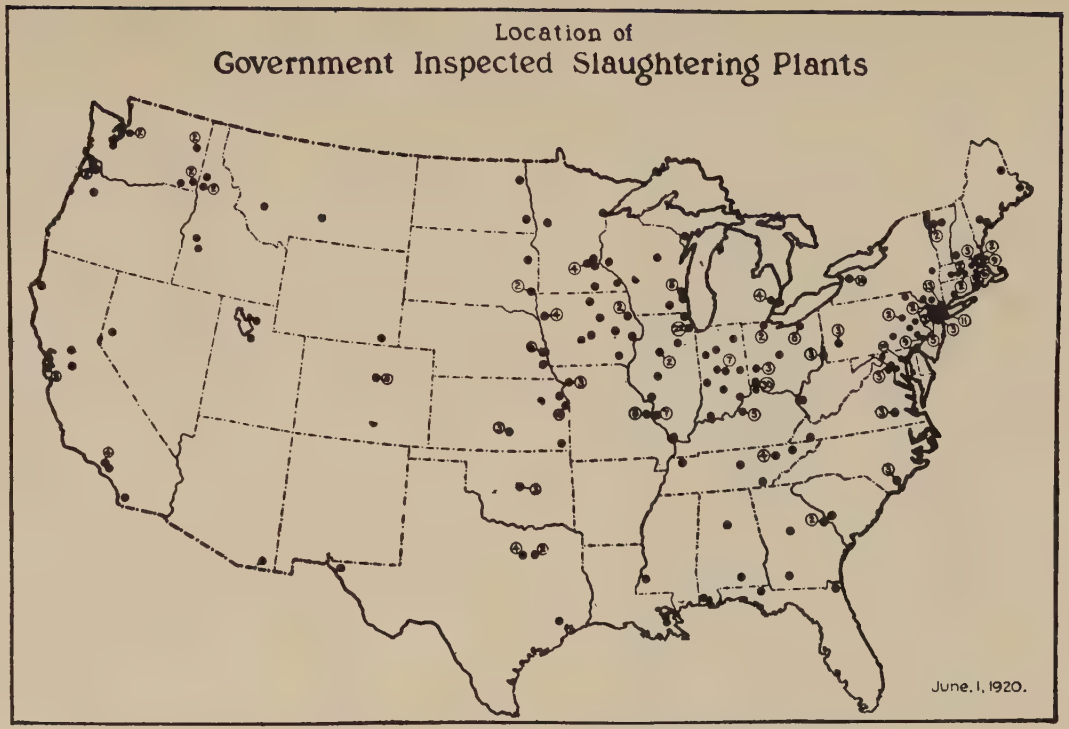


Figure. 19. Map Showing Location of Government-Inspected Slaughtering Plants
The figures near the dots indicate the number of inspected plants at that point

slaughtering or of interstate business, at 5 by request, at 5 on account of being consolidated with another official establishment, and at 4 on account of violations of the meat inspection regulations or insanitary conditions. During 1921 the government inspectors examined 62,252,442 animals at packing plants, including cattle, calves, sheep, goats, swine, and horses, and 189,874 were condemned. Of the animals slaughtered at these plants, 8,179,572 were cattle, 3,896,207 calves, 12,452,435 sheep, and 37,702,866 hogs, and this service cost less than 6 cents for each of the animals slaughtered.

This survey indicates that the federal inspection of meats and meat food products destined for commerce possesses great economic importance for the packing industry which made it possible and is of untold value by its service in the field of hygiene, sanitation, and protection of the health of the people.

CHAPTER XVI

PACKINGHOUSE BY-PRODUCTS AND CHEMICAL CONTROL

By-Products and Chemists

The production and manufacture of by-products is today one of the most frequently discussed phases of the meat packing industry. Their importance has been pointed out by the larger packing companies themselves by showing the relation of by-products to profits, which indicates that by-products are the gold mine of the industry. But they are a comparatively recent development, and are due to the introduction of chemists and chemistry into the business. This introduction of the chemist and chemistry was a turning point of the packing industry, according to President Thomas E. Wilson of the Institute of American Packers, in an address before the American Chemical Society Convention in September, 1920. "The chemist has turned into practical channels of income what was in former times not only waste, but a source of expense for its removal."

With chemistry there came chemical control as a vital factor in large-scale meat packing, for the industry's business policy has been determined since then with more scientific regard for the possibilities of by-product development. Its influence has extended far beyond the actual manufacture of by-products. The period since chemical control was inaugurated has been characterized by more thorough, competent, and scientific management and operation of the business in all of its branches. There is now more complete and thorough organization, more thoroughly trained personnel, a more com-

plete and accurate knowledge of the business—all of which make for prompt and better service in every section of the country. Were it not for the ingenuity of the chemist in finding a way to utilize the offal of slaughtered animals, the price of meat would necessarily be very high.

Early By-Products

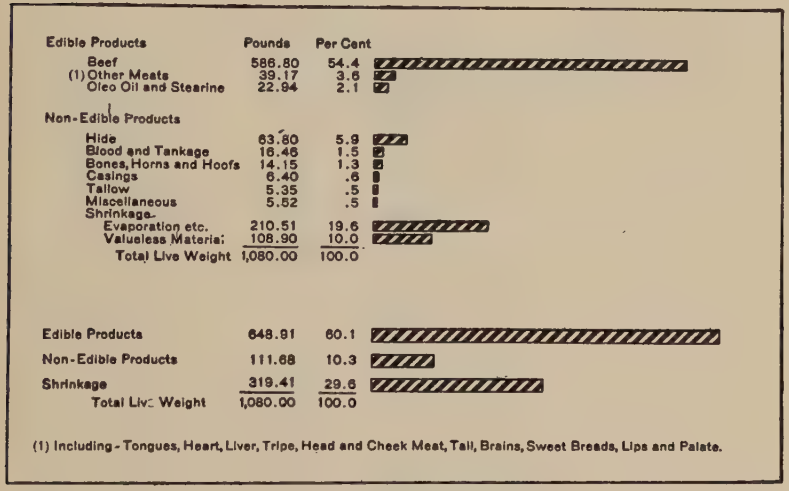
There had always been certain by-products in the meat packing industry, as has been seen in the chapter on the technique of packing in pre-refrigeration days, when pork packing was the most important phase. To mention them again, the principal by-products before 1875 were lard, lard oil, tallow, soap, glue, fertilizer, bristle-dressing, some of which products were not made by the packers themselves, but were nevertheless by-products. In Chicago in 1863 hog packing products consisted of bristles, lard, mess pork, hams, shoulders, bacon, lard oil used in lamps and lard stearin used in making candles. While there was a certain amount of utilization of by-products for many years before the scientific awakening which took place in the eighties, it had been done by comparatively loose, rule-of-thumb methods. There had been just enough easy money realized out of by-products at times when conditions were favorable, and hard-earned money lost when they were unfavorable, to arouse the minds of thinking men and show them the chances of greater profits.

Since much misinformation is in circulation concerning the rôle of by-products in packinghouse existence, it is well to consider briefly at this point the proportional part the raw by-products play in the credits to each individual animal slaughtered, and the use to which these various raw by-products are put.

Steer By-Product Percentages

It is not possible to obtain directly comparable figures for all classes of livestock, due to the differences in utilization of

the various parts of the different animals, with the attendant differences in accounting methods, but the failure to be comparable exists only to a slight degree. For the quarter ending June 28, 1920, at Armour and Company's Chicago, Kansas City, Omaha, St. Louis, Ft. Worth, Sioux City, St. Joseph, St. Paul, and Denver plants, 201,213 head of cattle, omitting calves, were killed. The meat from these animals totaled in value $18,230,488.13, an average of $90.60 per head. The


Edible Products
Pounds
Per Cent
Beef 586.80 54.4
(1) Other Meats 39.17 3.6
Oleo Oil and Stearine 22.94 2.1
Non-Edible Products
Hide 63.80 5.9
Blood and Tankage 16.46 1.5
Bones, Horns and Hoofs 14.15 1.3
Casings 6.40 .6
Tallow 5.35 .5
Miscellaneous 5.52 .5
Shrinkage-
Evaporation etc. 210.51 19.6
Valueless Materia: 108.90 10.0
Total Live Weight 1,080.00 100.0
Edible Products 648.91 60.1
Non-Edible Products 111.68 10.3
Shrinkage 319.41 29.6
Total Live Weight 1,080.00 100.0
(1) Including - Tongues, Heart, Liver, Tripe, Head and Cheek Meat, Tail, Brains, Sweet Breads, Lips and Palate.

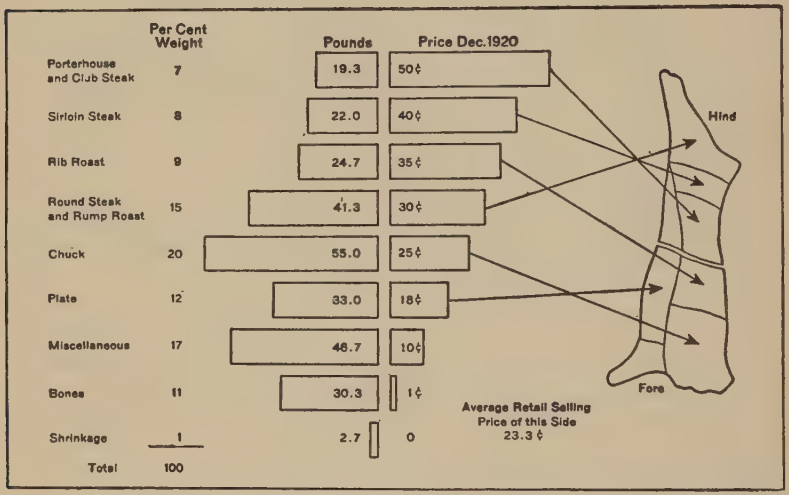
Courtesy Commercial Research Department, Swift and Company

Figure 20. Chart Showing Percentage of Beef and By-Products from a 1,080-Pound Steer

hides totaled in value $2,865,403.31, or $14.23 per head. All by-products, both edible and inedible, totaled $1,555,780.51, or an average of $7.73 per head. For the steer, this would make 80.5 per cent of the credits apply to the meat, 12.6 per cent to the hide, and 6.9 per cent to the by-products. Of these by-product credits for the steer, nearly 43 per cent is for oleo fats.

It will be noted that the hide is considered separately from other by-products of the industry, as both hides and pelts were

of relatively high market value before the era of the modern packinghouse. Another calculation made by Swift and Company for the year 1920 shows that there was paid out an average of $93.85 per head of cattle, and there was received only $83.31 for the meat and $21.17 for the hides and other by-products. This made total receipts of $107.48 and left a margin of $13.63 to cover expenses and profits.



Courtesy Commercial Research Department, Swift and Company

Figure 21. Chart Showing Weights and Prices of Retail Cuts from a Side of Beef

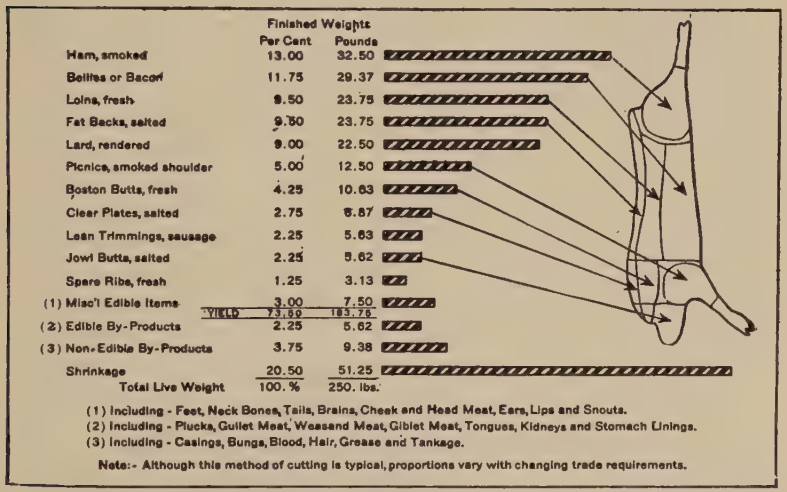
Weight 275 pounds, wholesale price 17.25 cents per pound

The expense of plant operation, freight to market, and branch house expense, amounted to $2.75 per hundredweight, or $13.69 per head. This actually left a loss during 1920, not including interest, of 6 cents a head, or approximately 1 cent per hundred pounds of beef. Of course 1920 represents a rather poor year for business, the question of profit and loss depending upon the constantly changing markets for the various by-products. A clear idea of the relative quantities of beef and pork and their by-products is given in Figures 20, 21,

and 22, which show the amount of products in pounds and in percentages of the whole animal.

Hides

Hides are divided into two great subclasses: packer hides and country hides.[1] Packer hides are taken off uniformly, are cured and stored under standard conditions, and are usually available in such numbers that purchasers may secure several


Finished Weights
Per Cent
Pounds
Ham, smoked 13.00 32.50
Bellies or Bacon 11.75 29.37
Loins, fresh 9.50 23.75
Fat Backs, salted 9.50 23.75
Lard, rendered 9.00 22.50
Picnics, smoked shoulder 5.00 12.50
Boston Butts, fresh 4.25 10.63
Clear Plates, salted 2.75 6.87
Lean Trimmings, sausage 2.25 5.63
Jowl Butts, salted 2.25 5.62
Spare Ribs, fresh 1.25 3.13
(1) Misc'l Edible Items 3.00 7.50
YIELD 73.50 183.76
(2) Edible By-Products 2.25 5.62
(3) Non-Edible By-Products 3.75 9.38
Shrinkage 20.50 51.25
Total Live Weight 100. % 250. lbs.
(1) Including - Feet, Neck Bones, Tails, Brains, Cheek and Head Meat, Ears, Lips and Snouts.
(2) Including - Plucks, Gullet Meat, Weasand Meat, Giblet Meat, Tongues, Kidneys and Stomach Linings.
(3) Including - Casings, Bungs, Blood, Hair, Grease and Tankage.
Note:- Although this method of cutting is typical, proportions vary with changing trade requirements.

Courtesy Commercial Research Department, Swift and Company

Figure 22. Chart Showing Percentage of Pork Products from a 250-Pound Hog

thousand of one grade of hide. On the other hand, country hides are removed according to the idea of each individual skinner, and are usually imperfectly cured and stored, always show greater percentages of cuts and gashes, and are never on the market in sufficiently uniform grades to allow narrow selections of any number in a given grade.

Packer hides are divided into subclasses as follows:

[1] This information on hides is taken from the monthly letter, May, 1921, of Mr. Edward N. Wentworth, Director, Armour's Livestock Bureau.

AVERAGE CURED WEIGHT (Lbs.)

Steers:		
Natives:		
Spready.....Minimum width	6 ft. 6 in.	
Heavy	60 up	62–65
Light	50–60	54–55
Extreme Light	25–50	40–45
Branded:		
Butt branded	50 up	60–65
Colorados (side branded)	50 up	60–65
Heavy Texas	60 up	63–65
Light Texas	50–60	55–56
Extreme Light Texas	25–50	40–45
Cows:		
Natives:		
Heavy	55 up	60
Light	25–55	42–48
Branded	25 up	43–55
Bulls:		
Natives	25 up	70–85
Branded	25 up	70–85
Calves:		
Kips	15–25	
Packer Calves	Under 15	
Slunks.....Sold by the piece		

Spready native steer hides are measured from brisket to brisket as the hide is stretched flat; that is, the measurement corresponds to the girth. Spready native steer hides are used for automobile, carriage, and furniture leather. Heavy and light native steer hides are used for harness and belting leather. Extreme light native steer hides are used for upper and belting leathers. All branded steer hides are used for sole leather, as are branded cows. Heavy native cows are used for harness, automobile, and furniture leather, while light native cow hides are used for case and bag leather, harness, upper leather, and belting.

Country hides are classified as follows:

	Weight (Lbs.)
Heavy:	
Steers	60 up
Cows	60 up
Buffs	45–60
Extremes	25–45
Bulls:	
Branded:	
Side branded country packer	25 up
Side branded country	25 up
Calfskins:	
Kips	15–25
Calf	8–15
Light Calf	Under 8
Deacons	Under 7
Slunks	Sold by the piece
Horsehides	
Hogskins	

Horsehides are sold by the hide and not by weight, while hogskins are sold by the pound.

Dry hides are not normally an important factor in the American hide market, but South American hides are marketed dry in relatively large numbers, due to the relative permanence of the hide in that form. The cost of gathering for market in the United States, however, is such that producers today get practically nothing for their dry hides. Fallen hides are those removed from dead animals, while glue hides are those unfit for tanning. Dry hides are classified as follows:

Heavy westerns
Light westerns
Kips
Calf
Fallen
Glue hides
Dry salt hides

To indicate in a graphic way the extent of packinghouse by-products today a representative list, summarizing them, is given at the end of this chapter.

Early By-Product Waste

Returning to the historical development of by-products, the instances of waste before refrigeration came into use were appalling. Before 1875, when no meat product aside from the main carcass (which was susceptible of curing) was considered worth saving, there are cases on record where the whole heads of hogs were buried in carload quantities, merely to get them out of the way and to facilitate the conduct of more important business.

An instance of this kind occurred a number of years ago, when in excavating for the foundation of a modern packing-house in the Union Stock Yards in Chicago, the workmen came upon a great quantity of gummy unworkable material which had to be removed in its entirety before further excavation was possible. The obstruction proved to be the remains of several thousand heads of hogs, which had been discarded and dumped into a trench by some old-time packer as the most practical and expeditious way of getting rid of them, in a great effort to get a quantity of pork on the market. Being composed of fat they had resisted decay to such an extent that they were, even at the time of their removal, considered worth the trouble of rendering, and the grease which resulted proved quite profitable for the rendering concern which came and took them away. This was the state of affairs before the day of conservation of resources.[2]

A distinct but feeble agitation in favor of sounder and more economical methods of business in the United States began during the first few years after the Civil War. Experimenters in some of the packinghouses throughout the country tried out methods of refrigeration as a means of preserving meats in a fresh state, as distinguished from preservation by means of pickling in brine and smoking. It was this lack of effective and extensive refrigeration facilities previous to the middle seventies which was primarily responsible, not only for

[2] *The National Provisioner* (Jan. 16, 1915), Vol. LII, No. 3.

the enormous waste up to that time, but also for the fact that slaughtering was possible only during the winter months. In the absence of either chill rooms or refrigerator cars, the only forms of meat known to commerce or recognized on the boards of trade were those of brine pickle and dry salt.

Refrigeration Aided By-Products

By the seventies these difficulties were beginning to be controlled to some extent and small ice boxes were being constructed everywhere, which really enabled some of the packers to do a slight local business in fresh meats. It also made it possible for them to save certain of the more important by-products from deterioration for a sufficient length of time to give opportunity for their proper disposal over the butchers' block or otherwise.

A very important development of 1876 from a meat packing point of view was the engagement of Joseph Nicholson, a packinghouse architect, to construct for P. D. Armour the first large refrigerated meat warehouse in the world. From the start this proved to be a success and enabled Armour to turn to very good account a number of the more valuable by-products of his business, which had been formerly thrown away. Other packers quickly followed his example.

Chemists and Chemical Control

This was the state of things when the scientists first began to appear on the scene and the new methods indicated the great possibilities of chemistry and chemical control. Thus the idea of maximum utilization of animal by-products is little more than forty years old. The evolution of this industry to the high degree of efficiency which it enjoys today has received an added impetus from each of the following influences, which are named in the order in which they became chronologically effective: first, the necessity of economically disposing of vast quantities of animal waste; second, an effort to recover enough

in the value of the crude products resulting from the processing of these wastes to defray the costs of handling; third, the desire to make it a profit-producing enterprise; and fourth, the readjustment of the packing industry to meet the changed economic conditions. These factors in the main have brought the conservation and utilization of animal by-products to their present status.

A Series of Industries

The modern large packinghouse is composed of a group of industries. The meat packing phase itself consists usually of the slaughter of animals, resolving the carcasses into various commercial cuts, curing, smoking, canning, assorting the various by-products and their conversion into finished products, the manufacture of sausage and other meat food products, etc. In addition to this, large packers are engaged in a number of specialized industries on a good-sized commercial scale, which are distinctive in themselves, e.g., the cottonseed oil industry, the poultry industry, the manufacture of "compound" (a substitute for lard), oleomargarine, fertilizers, both animal and mineral, sulphuric acid, glue, hair felt, curled hair, anhydrous ammonia, creamery butter, canned specialties, soda fountain products, soap and toilet specialties, pharmaceuticals, and so on.

Blood and Bones

In the late seventies a means was found for turning to good account the great quantities of blood and tankage which had previously been turned into the river. John Bushard, the mechanical superintendent of Armour and Company for many years, was an aggressive exponent of the new methods. He invented several successive processes for the drying of this blood and tankage, and it was thereafter prepared and shipped east and south to be used in the manufacture of fertilizer. The genius of John Bushard was also responsible for the

invention of a number of other appliances and methods, among them a type of ice machine of which several are still in use in Chicago plants.

In 1879 one of the packers put canned meats on the market, and in 1880 butterine, both the result of scientific investigation and experimentation with perishable products. This work in turn was made possible by refrigeration. In 1882 a demand from Europe and the eastern states of the United States began to develop for the shin and thigh bones of cattle, to be used in the manufacture of knife and brush handles and buttons. No use had yet been found for the hoofs and horns.

The Glue Business

By 1884 the adaptability of scientific methods to the utilization of packinghouse by-products had become so thoroughly recognized by P. D. Armour and his associates that he was prevailed upon to take over, as an investment, the glue works at 31st and Benson Streets, Chicago, which had been started by Wahl Brothers fifteen years before. This inconspicuous enterprise had been going on quietly from year to year, applying the searchlight of science to one difficult problem after another until those in charge of it had developed a business of considerable importance.

Wahl Brothers up to this time had been buying their materials at practically "give-away" prices from the packers, who were eager to dispose of their by-products at any price which relieved them of the necessity of burying or shipping them away. The capacity of the business was thus recognized as a commercial success and was placed upon a firm financial footing, rapidly outdistancing itself, not only developing a capacity for the utilization of more raw material than there was in sight, but also a market demand for more of the finished products than it was able to supply. Today the Armour Glue Works receives its raw materials from all over the world and utilizes them under the guidance of expert chemists in the

manufacture of high-grade gelatins, glues, sand paper, and other staples of similar kind.

Prior to the time that chemists were made a part of the regular packinghouse operating force, the packers disposed of some of their by-products in a crude unfinished state to such concerns as Wahl Brothers, already mentioned, which employed chemists. Pressed, undried tankage and blood, glue in jelly form, and evaporated tank water, commonly termed "stick," are examples. Steam-rendered lard was another. This in the early days was frequently discolored, but in 1879 and 1880 was first improved by a chemist, W. B. Allbright, before he became identified with a packinghouse. The improvements were generally the result of the combined efforts of the chemical, engineering, and operating staffs. As yet, however, there were no regular chemical laboratories or chemists regularly employed as part of the operating force in the big packinghouses of the country. The story of how they came to be employed is an illuminating one.

Story of Oleomargarine

In 1870, under instructions from Napoleon III, Mège-Mouries, a Frenchman, succeeded in producing from foreign fats taken from beef a substitute for butter, but less expensive.[3] He named his product oleomargarine, not as is sometimes stated because of its resemblance to pearl, the Latin name of which is "margarita," but because it contained, as he believed, the glycerides of oleic and margaric acids. The name "margaric acid," on the other hand, was derived originally from the Latin, though probably before Mège-Mouries used it.

His process was essentially as follows: He heated finely chopped beef suet with water carbonate of potash and fresh minced sheep's stomach to about 115° F. At this temperature

[3] *The National Provisioner* (Sept. 27, 1913), Vol. XLIX, No. 13, "The Manufacture of Oleomargarine," a paper read at the American Meat Packers' Convention in 1913 by J. J. Carey, Vice-President Carey-Vail Butterine Company.

the pepsin from the sheep's stomach dissolved and separated the animal tissue from the oil, which he then removed and cooled slowly, thus causing a portion of the stearin to crystallize. He then separated by pressure the crystallized stearin from the oleo oil, and this oil alone he used for butter making. He churned about 10 pounds of this fat with 4 pounds of milk and 3 pounds of water and a trace of annatto for color. The compound thus obtained when well washed was in appearance, taste, and consistency, like butter, and when worked free of excess moisture was found to keep much longer.

Margarine Growth in America

This process was patented in the United States in 1873 where many improvements were made in it. Subsequently, upward of 50 patents were taken out by inventors, protecting various stages of the manufacture. Some of these covered curious processes and materials, such as saltpeter, boric acid, benzoic acid, slippery elm bark, glycerin, etc., to be sold under such names as butteroid, oleoid, creamine, oroxyline. However, Mège-Mouries in 1873 was not, as is sometimes believed, the first oleomargarine patenter in the United States, for earlier in the same year another chemist, Paraf by name, patented the process and organized a large company in New York City, known as the Oleomargarine Manufacturing Company. Between 1874 and 1878 the manufacture of oleomargarine made little headway, but during the next three years it advanced with great rapidity.

Under the Mège-Mouries patent alone, 15 large factories were established prior to the spring of 1881 in the cities of New York, Boston, Philadelphia, Baltimore, Pittsburgh, Cincinnati, Chicago, Buffalo, Cleveland, Albany, Louisville, Detroit, Omaha, St. Louis, and San Francisco. In 1895 there were five factories in Illinois, two in Indiana, three in Kansas City, one in Nebraska, one in Ohio, one in Pennsylvania, and four in Rhode Island. In 1883, 4,000,000 pounds of oleo were

sold in the United States; in 1893, 67,000,000 pounds; and in 1894, nearly 70,000,000 pounds; in 1902, 126,000,000; in 1914, 143,900,000 pounds; and in 1920, 370,730,000 pounds.

This enormous growth in the United States, however, did not compare with the growth in Europe. There the congestion of population and the poverty of the laboring classes made the growth much more rapid, and in 1912 a single factory in Rotterdam produced as much oleomargarine as the entire United States, according to an investigator for the *Scientific American*. Though the United States does not rank high in the oleomargarine trade of the world, it may claim some prominence as a manufacturer of the animal oils that go into the product, for large quantities of these oils are shipped abroad yearly by the American packinghouses, largely to Holland.

One of the early manufacturers of oleomargarine in the United States was Patrick Carey, who with J. J. Murray started to make oleomargarine 40 years ago. Their apparatus was necessarily crude and the process was tedious. Their vat consisted of a small tub surrounded by warm water in a larger tub, while the product was mixed by hand with a large wooden paddle. The process took five hours, and to make a salable or edible article they used a mixture containing 40 per cent of pure creamery butter. From such a primitive beginning the manufacture has grown very rapidly, with improved machinery and more refined stock and materials. The process as used today has been put on a strictly scientific basis and the progressive manufacturer makes a study of the production and quality of all the ingredients.

Patent Controversy and Chemists

This early history of oleomargarine and its influence on the development of packinghouse by-products is of fundamental significance. For the first time a chemist was employed in a consulting capacity in the meat packing industry, when Pro-

fessor Haynes was called upon to give testimony in a suit brought against one of the Chicago companies by the owners of the Mège-Mouries patents for the making of oleo oil. Dr. D'LaFontaine was employed in 1884 as a consulting chemist by Armour and Company to prove that cottonseed oil was present in oleo and that it could not be accepted as lard. Another consulting chemist was Dr. Rose, who did some work for Fowler and Company. Dr. Van Ruymbeke investigated the utilization of the waste tank liquors in connection with one of the packinghouses.

As a result of this suit Nelson Morris, the Chicago packer, was impressed with the great possibilities of adding chemists to his staff and in 1886 he employed the first chemist in a full-time capacity. He felt quite rightly that many problems confronting the industry at that time might be solved by scientific investigators. This pioneer full-time chemist was Herman B. Schmidt, who with his colleagues succeeded in the decade from 1886 to 1896 in solving the fundamental problems of chemical control in the industry and in laying down standards to be followed. Most of these leading pioneer chemists are living at the present time (1923) and have given very cordially much of the information forming the basis of this chapter.

In 1887 one of the other leading packers engaged Dr. Manwaring as their chemist to develop the recovery of pharmaceutical products, particularly pepsin, and in 1889, Dr. O. T. Joslin was engaged as the first chemist of another packer. Dr. J. P. Grabfield and Dr. A. G. Manns were also active pioneer chemists. E. K. Nelson became identified with the industry a little later on, as did likewise W. B. Allbright, now head of the Allbright-Nell Company of Chicago. It has been principally under the direction of these men, together with Dr. W. D. Richardson and Dr. Paul Rudnick and the chemists actively connected with the industry today, that other contributions of the chemists to this industry have been made.

Chemists' Early Troubles

For sometime after starting his new work Mr. Schmidt had many trials, for the rest of the staff looked upon his department as a luxury. In order to prove that it was worth while and could justify its expense, he shrewdly introduced a vacuum pan for the making of extract of beef, which put his department, at that time housed in a room 10 x 10 feet, on a dollar-and-cent basis. In this way various and numerous sources of this product were investigated very carefully. The curing of meats was studied and means were discovered to prevent the souring of the liquors in which the material was cured.

The installation of vacuum evaporators, first single effect, and later multiple effect, stimulated the recovery of boiled beef liquors. These evaporated liquors were at first further concentrated into paste of "solid" beef extract by drying on cast iron steam-heated revolving roll evaporators, and it was not until some years later that they were supplanted by vacuum kettles with agitators. It is rather interesting to note that practically since the days of Liebig the development of the extract of meat manufacture has been under the direction of chemists.

A Routine Developed

With the regular employment of a chemist it became necessary to develop a routine of work. Some lines already offered such a routine. For example, the Pennsylvania Railroad Company used on its lines in 1886 steam cylinder lubricants, for which as an ingredient they purchased a certain high-class tallow. It was specified by the railroad company that this tallow should test not over 1½ per cent of free fatty acid. The development of this idea, to make as much tallow available for this purpose as was possible, led to control of the free fatty acid test of the various products that were made, and the study of the conditions under which free acid was pro-

duced. This investigation resulted in eliminating those conditions that contributed to the production of free fatty acids and so made the tallow product more valuable.

The recovery of tank water containing dissolved nitrogenous constituents, resulting from the cooking of various kinds of packinghouse offal, marked an important step forward from a sanitary as well as from an economic viewpoint. A concern in Hammond, Indiana, employing as chemist Dr. Van Ruymbeke, is said to have been the first to develop the evaporation of tank water which was evaporated to a jelly form in a double effect evaporation. This work was done under the supervision of Dr. Van Ruymbeke, who was the first to do this work in the Chicago Stock Yards. The material was then shipped to Hammond and mixed with copperas and dried in pans. This latter treatment with sulphate of iron was patented by Jobbins and Van Ruymbeke. Later, O. T. Joslin, a chemist for one of the packers, substituted a process of his own wherein the evaporated tank water was coagulated with a ferric sulphate solution and dried on the roll invented by him. This roll system was devised in 1892–1893.

Tallow Refining

The refining of tallows was started in 1886 and the pressing of tallows into tallow oil and stearin and the refining of the tallow oil into acidless grade was started possibly a year later, in 1887. The refining of tallow and oils by means of the fuller's earth treatment was then coming into vogue in the Stock Yards and in the next year or two it became universal. Somewhat later naphtha extraction of tankage and bone was experimented with. This at first met with obstacles in the way of insurance restrictions, but was later developed to its present status. Its general adoption was somewhat slow because of the low grade of grease recovered and the fact that there was only one concern in this country at that time capable of refining this product.

Compound Lard

In 1879–1880, W. B. Allbright first applied chemical treatment in this country to prime steam lard to improve its color. This treatment consisted in the use of caustic soda. To quote Mr. Allbright: "This made so much soap, that in studying for a more economical method I hit upon fuller's earth." This is the first record of employing fuller's earth for this purpose, and it led to investigations the result of which was the present compound lard industry.

This industry, which produces yearly many million dollars' worth of the product and in which millions are invested and thousands of persons employed, has developed practically within the last 40 years.[4] It had its beginning in what was once known as "lard refining," which originally consisted in purchasing hog lard from various sources, washing it in kettles with pearl ash or other alkalies and salt to settle it, then cooling and filling into packages. By this means the refiner was able to turn out a uniform product which gave good satisfaction to the trade.

The original standard of lard was pure leaf lard, rendered from the leaf fat of the animal. Only a limited amount of such lard could be made, and consequently the lard refiner purchased from all sources lard made from trimmings, head fat, and other portions, which produced a lard much softer than that of the leaf. In order to give the lard the proper consistency the plan was devised of chilling it in properly arranged cellars and submitting it to pressure. This produced a lard oil and left behind a firm lard product known as "lard stearin," which was considerably harder than leaf lard. This was mixed with the refined lard in the right proportions to make products which would be as hard as leaf lard, or even harder so as to suit the different markets for which the lard was intended.

[4] Wesson, Dr. David, "History of Lard Substitutes," in *The National Provisioner* (Jan. 28, 1911), Vol. XLIV, No. 4; reprinted from Bulletin 13 of Bureau of Publicity of the Interstate Cottonseed Crushers' Association.

Cottonseed Oil and Lard

About 1880 it was discovered that cottonseed oil by proper treatment with various chemicals could be bleached fairly white. It did not have a very good flavor, but this did not deter the lard refiners from working a little of it into their product. The oleomargarine industry, springing into prominence about this time, furnished also stearin, which refiners used to harden up, or offset the softness of the oil in their mixtures. The process of mixing was comparatively simple, while that of cooling consisted in passing the melted fat into upright jacketed cylinders, which had either cold water or brine from an ice machine passing through the jackets. The lard was agitated in these "agitators," as they were called, until it was cold and of the proper consistency to run into the packages.

It was about this time that Allbright, as has been noted, discovered that oil could be bleached by means of fuller's earth. This furnished a very superior bleach to that made by treating the yellow oil with acid, and refiners were used to work in as much as 40 per cent oil with 10 per cent oleo stearin, the balance being hog lard. The fuller's earth gave the oil a bad flavor and the skilful manufacturer depended upon the flavor of the hog lard to cover it up.

Cotton Oil and Prime Steam Lard

In this country the first literature on the subject was published in 1883 when McGeogh, Everingham and Company brought suit against Fowler Brothers of Chicago, claiming that a contract for prime steam lard delivered by the latter was adulterated with cottonseed oil and tallow.

The final verdict seemed to be a case of "not guilty—but don't do it again." At this time the so-called mixtures were sold under the name of "refined lard" or "refined family lard," to distinguish them from the prime steam lard—the contract lard of commerce, but in 1886 a bill was passed in the Massachusetts legislature, compelling all such mixtures to be branded

"lard compound." In 1888 when bills were introduced into both houses of Congress for the purpose of placing a tax on lard compounds in the same manner as the tax that had been imposed on oleomargarine shortly before, it was stated that the total amount of lard produced annually was 600,000,000 pounds, about one-half being pure lard. One-half of this amount was exported, of which about 40 per cent was compound. Up to this time more or less hog lard was used in all compounds.

About 1891 the industry received a great impetus by the application of what was then known as the "Eckstein" process of refining the oil, which made a much more neutral oil than before, with the result that the hogless lard and various substitutes produced today from cottonseed oil are giving better satisfaction than the hog product.[5]

Commercial Fertilizers

Another of the family of packinghouse industries of great proportions is that of commercial fertilizers which was started in the late eighties. In 1868 the waste water which had, up to that time, been turned into the sewers and allowed to escape to the sea without being subjected to challenge, was, to use

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[5] Departments in a modern lard refinery:

1. Oil Storage. Storage tanks for the oil which is received from the refinery either by pipe lines or tank cars, or barrels, as the case may be. The storage tanks vary in size with the refinery and the size of business contemplated, 500 to 5,000 barrels capacity common. These tanks are generally placed in the open and are, of course, closely covered to prevent access of dust and air. Great care to see that tanks and cars are clean should be taken.

2. Oleo Stearin Storage. This should consist of a large, dry, cool, well-ventilated room. The careful manufacturer selects only stearin which is found on test to be sweet and pure and of the proper hardness to suit his purpose. This stearin is a by-product of the manufacture of oleo oil and varies in quality, etc., to fat used. It comes from the packers usually in barrels similar to those for shipping sugar.

3. Melting and Mixing Plant. Here the oleo stearin is emptied into suitable tanks provided with large heating coils, where it is melted up and pumped through a filter press, from whence it runs into tanks where it is mixed in the proper proportions with refined oil.

4. Cooling Department. This consists of large rolls on cylinders, similar to those previously described. The thin film of compound in contact with the roll is chilled almost instantly, and as the roll revolves the film is kept in contact long enough to remove all heat before the frozen compound is removed automatically by a knife pressing on the side of the roll. The lumps of frozen material drop into a trough, where they are broken up by means of blades on a revolving shaft. The semiliquid lard passes from the rolls into the packages, where it hardens up or sets in the course of a few minutes, very much after the manner of a mixture of plaster of paris and water.

The product of the modern refinery is white and sweet, excellent in appearance, flavor and odor, and, according to judges, better than the best products made from the hog.

Mr. C. H. MacDowell's phrase, "held up and convicted of pilfering tendencies." As a result of this discovery a process was developed for the evaporation of all waste waters and extraction of the ammonia and solids which they contained. The solids which remained after this process of evaporation were turned to good account, and made to serve as one of the important ingredients of commercial fertilizer.

Fertilizers were added in 1893 to the list of packinghouse by-products as a result of certain observations and conclusions arrived at in the fertilizer booth of the World's Fair in Chicago by C. H. MacDowell, president of the Armour Fertilizer Works. MacDowell had been assigned by P. D. Armour to represent the house there. The foreign and domestic exhibits of potashes and other fertilizer materials, especially those of the German Potash Syndicate, made an appeal to him. He saw the possibilities of the fertilizer industry in the United States and how tankage, blood, and bones could be expanded into a large independent industry. As a result Mr. Armour was persuaded that an opportunity was being neglected.

Until after the World's Fair the packers had continued to sell all dried blood and tankage, instead of making any attempt to utilize it themselves. In the spring of the following year MacDowell, in collaboration with George Hunt, who had been handling the sale of blood and tankage, set about actively to start a small fertilizer factory and turn out some commercial fertilizer which few people were able to differentiate in their minds from common old-fashioned manure.

Southern Phosphate Experiments

Phosphoric acid had been obtained almost solely from bones. Phosphate rock had been discovered in Tennessee in 1893, and the other deposits were in the Carolinas and Florida. Some of this was brought to the Armour plant, where it was ground up in crude bone mills and acidulated in sulphuric acid, purchased from the zinc smelters. The mixing was done with

common hoes in mortar boxes out in the yards, so that fumes might escape freely into the air and blow away.

This method was not satisfactory as the mixture was wet and sticky and not at all suitable for mixing with other ingredients. There was no literature on the subject and the people who knew how to make acid phosphate kept the secret to themselves. One day a severe rainstorm came up while a vat of 60 degree sulphuric acid was out in the open. It rained hard for two hours, and when the foreman and workmen returned to their mixing of acid phosphate, they discovered the vat of acid apparently steaming. To their surprise the acid phosphate then mixed in the regular way with this sulphuric acid foamed up and produced an excellent article of a satisfactory mechanical condition. Dr. Manns, the chemist, at once saw that a weaker hot acid was necessary to produce the desired reaction and from that time on no trouble was found in making acid phosphate.

Since that simple beginning one plant after another for the manufacture of Armour's fertilizers has been built at favorable points in various sections of the East and South until today these number more than 30. The fertilizer end of the packing industry has perhaps made greater use of the chemist than other lines.[6]

In 1895 the manufacture of curled hair was begun at the Armour Glue Works, in which were utilized not only cattle switches derived from their own slaughtering, but also large quantities of horse tails from South America. One of the by-products which developed about this time had as its sponsor a great public fad. The Safety bicycle, which was invented in 1888 and made tremendously popular almost immediately by the application of "clumsy" or pneumatic tires, created a huge demand on the part of the manufacturers for granulated bone, which they began in 1895 to use as a newer and cheaper

[6] MacDowell, Charles H., "The Trail of the Chemist in the Packing and Allied Industries," *Chemical Age*, June, 1921, p. 217.

means for "case hardening" in the manufacture of ball-bearing cones. This trade was catered to, of course, and then its decline was superseded by that of the automobile industry which followed. This product is also extensively used by the United States government for putting the blue color on steel rifle barrels and for other ordnance.

Soap

The Armour soap works was organized in 1896. P. D. Armour had determined to go into the soap business and consulted among others C. H. MacDowell, whose other experiment at utilizing by-products was by this time proving, through its profitableness, his sound judgment. MacDowell was asked to take charge of the development of a soap business. It was decided that the manufacture of laundry soap alone should be undertaken at the start and that Armour Glue Works should be the proper place at which to inaugurate the enterprise. A small plant was accordingly built at that place and the distribution and sale of Armour's Family Soap was undertaken through the branch house system. Glycerin was one of the early developments of the manufacture of laundry soap, after which the growth of this branch of the business was very rapid until it came to include a very extensive manufacture of toilet soaps, as well as refined glycerin soap powders and "Lighthouse" cleanser. Swift and Company also have developed a large soap business at the same time as Armour.

Pharmaceuticals

There is another series of by-products which have been of great benefit to the community. In 1885 the corps of scientists and other expert investigators which had been gradually growing in numbers and in resourcefulness, resolved to open a pharmaceutical laboratory for the manufacture of pepsin and pancreatin. This pharmaceutical branch of the business was undertaken and at first conducted by men like Robert

Wilson. At present, for the medical profession only, 48 pharmaceutical preparations are made, glands and membranes being utilized, while fresh, in the plant laboratories. Among the most important medical agents produced in the packinghouse laboratories are pepsin, pancreatin, thyroids, rennet, benzoinated lard, suprarenals, and pituitary liquids.[7]

A Packinghouse Laboratory

To get a clear picture of just what chemical control means, and how it works, it is worth while to consider the chemical laboratories of one of the larger packers, that of Swift and Company, where all food questions, such as sanitation, nutrition, and new food products are dealt with.

The central laboratory of the chemical department of Swift and Company is at the top of the lard refinery in the Union Stock Yards, Chicago. First there are several administrative rooms from which the work of the Chicago laboratory and its many branches is directed.[8] Here is a very complete chemical library. The work of the Chicago laboratory can be summarized in this way: First, it analyzes all samples requiring chemical analysis. Second, it makes special investigations

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[7] These are made from glands and membranes of hogs, cows, and sheep; among them are some of the most important therapeutic agents.

Pepsin is from the lining of a pig's stomach; it is used as an aid to digestion, and in stomach troubles generally. The most popular forms are pure pepsin, essence, and tablets.

Pancreatin comes from the hog's belly sweetbread. It is employed as a medicine and to peptonize food for infants and invalids.

Thyroid glands of sheep are made into powder and tablets. Thyroids are a specific medicine, and are used in diseases that are due to a deficiency of thyroid secretion. A great many cases of abnormality in children can be cured by thyroids.

Suprarenal preparations, made from the glands that are located just above the kidneys, are used internally, and from the substance is got a powerful astringent and heart stimulant called suprarenalin, which is worth more than $5,000 per pound. It requires the glands of 135,000 sheep to make 1 pound of suprarenalin.

Pituitary products, from a gland located at the base of the brain, are of great service to the medical profession. The finest of the pituitary preparations is pituitary liquid, a solution of the active principle.

Rennet, the curdling ferment from the calf's stomach, is used in pharmacy, but its greatest field is in making cheese. All cheese factories require rennet in large quantities.

[8] The main branch laboratories are at Kansas City, South Omaha, South St. Joseph, East St. Louis, Fort Worth, North Portland, and Kearney, Nebraska. The fertilizing factories are at West Hammond, Illinois, Cleveland, Ohio, Baltimore, Maryland, Wilmington, North Carolina, Atlanta, Georgia, Harvey, Louisiana, and Barton, Florida. The laboratories in soap factories and oil refineries are at Cambridge, Massachusetts, Atlanta and Augusta, Georgia, and Houston, Texas. Test rooms are maintained at Memphis, Tennessee, Charlotte, North Carolina, Chicago, Kansas City, Kansas, Toronto, Canada, Ft. Worth, Texas, South Omaha, Nebraska. The department also carries on inspection tests at 35 creameries.

Figure 23. Pharmaceutical By-Products

and researches with a view to developing further the uses of main products and by-products, determining the value of processes suggested from one source or another, and discovering new processes. Third, it conducts dietary experiments to determine the value of oleomargarine and, in general, all packinghouse products. Besides these main functions the chemical department also handles the chemical and microscopic work for the plant doctor's office. It trains all chemists for Swift and Company's 16 other laboratories. It acts in a consulting capacity for operating sales and administrative departments. It follows the patent literature, keeping on file copies of all patents relating to the packing business.

Analytical and Testing Department

To consider the departments of the laboratory individually, the first is the analytical and testing department. The fertilizer section handles the analysis of all fertilizer raw materials and finished products, such as phosphate rock, sulphuric acid, acid phosphate, blood, tankage, bone, cottonseed meal, nitrate of soda, sulphate of ammonia, and so forth. Moreover, samples are analyzed of all fertilizers in various stages of manufacture, and of the final mixed product before shipment. In addition to this, different mixtures are tested out for what is called their "mechanical" condition; that is, whether or not they will cake in piles or sacks.

The samples come to the fertilizer sample room, where they are ground and then delivered to the head chemist of the fertilizer section of the laboratory. He assigns the work among his various assistants, who, by means of the complete laboratory equipment, make the necessary tests and analyses. They make their reports, and these reports are checked in the proper quarters. All this is very necessary work, for fertilizers are put out under a guarantee, and the chemical department has the responsibility of seeing that the guarantee is backed up absolutely by the product.

In another section all oils and fats, edible and inedible, are tested regularly. This work includes analyses of lard, tallow, grease, cottonseed oil, soya bean oil, cocoanut oil, peanut oil, lard compound, oleomargarine, and so forth—the raw materials, the products at various stages of manufacture, and the finished product.

The next section is that dealing with soap and soap products, and glycerin. Here the raw materials of soap manufacture, such as oils, fats, and greases, caustic soda, soda, ash, borax, and other substances are analyzed. Soap is tested at all stages of manufacture, also when finished and ready for shipment. Glycerin, which is the principal by-product of soap manufacture, is also analyzed during the course of purification, as well as when ready for shipment in the form of dynamite, or chemically pure glycerin.

The fourth section is devoted to the various processes of curing meats. This is very important work, for the quality of hams and bacon depends upon the accuracy and thoroughness with which certain analytical tests are carried on in the chemical laboratories. These tests and their results are secret, but this much can be said—the chemists supervise the admixture of preparations that are used in curing meats; this insures their uniform and standard quality. Indeed, this department analyzes all curing materials, such as salt, saltpeter and sugar, and all cured meats as well, namely, ham, bacon, salt pork, cured beef, and dried beef. The materials are analyzed before, during, and after the process of cure in order to determine that the curing process is operating uniformly and to insure a uniform high quality in the finished product.

Test All Supplies

The fifth section handles all engineering supplies, testing every substance used by the construction department in any way. The cement that goes into the floors, the paint for the woodwork, the steel for the girders, the solder for plumbing—

samples of every material are tested in the chemical laboratory. Engineering supplies, such as water, coal and fuel oil, lubricating oils, paints and varnishes, iron and steel, babbitts, and bronzes, cement and plaster, and, in general, all supplies entering into the construction operations, are regularly analyzed.

The sixth and final section is devoted to glue testing. All glue raw materials and the finished products are regularly tested for composition and strength, or technically for viscosity, jelly strength, foam, fat, and keeping properties.

Research

There is no separately organized research laboratory as yet, but researches have been carried on diligently for twenty years. For example, the entire cold storage problem was investigated when the government was criticizing cold storage methods; researches were carried on regarding the effects of saltpeter and sugar in the cure of meats, the corrodibility of various irons and steels, the hydrogenation of oils and fats, the development of American sources of potash, and many others. For this research eight separate rooms are set apart.

Dietary Experiments

The next department is that which conducts dietary experiments. As a part of a great food manufacturing organization the chemical department finds it necessary to conduct extensive investigation in the field of dietetics. For example, since the war, dietary experiments have been in progress to demonstrate the comparative values in the diet of oleomargarine, meat, and meat products, including various fancy meats, canned meats, and vegetables. The laboratory has had as many as 1,200 white rats on its feeding schedule at one time, though the number varies from week to week. They are watched carefully and weighed regularly, and the various figures are gathered together into statistics that furnish the results of the investigations.

Bacteriological Department

The next section is the bacteriological and biological department of the laboratory. The plant doctor, in keeping the employees in fit physical condition, finds it necessary to have various bacteriological and chemical tests made, and this part of the laboratory does it for him. Other work of an important nature is carried on here, for it is this department which co-operates with the Biochemic Division of the Bureau of Animal Industry of the United States Department of Agriculture. The Biochemic Division has itself been of great assistance in the solving of chemical problems of the meat industry, the results of which research are published from time to time. As an instance of this co-operation sometime ago, this department in co-operation with the Bureau of Animal Industry, conducted an extensive investigation of trichinae. The results obtained were in full accord with those secured by the government, and the co-operation was beneficial to both parties. As a result definite regulations were established, determining the amount of cure and smoke necessary for pork products, and the protection of the public was carried one considerable step further.

Thus in one organization there are now the analytical chemist, the research chemist, the chemical engineer, and the business or commercial chemist.

Summary of Chemists' Work

The work of these present-day chemists, chemical engineers, or technologists in this industry in addition to analytical work for control of product and supplies may be summed up thus:

1. Waste prevention.
2. Improvement of methods and processes of operation.
3. Utilization or recovery of products in a more valuable form.
4. Initiation of new processes.

5. Direction of industrial research and application of the researches until placed on a commercial basis.
6. Investigation and putting on a commercial basis new industries and lines of activity allied and associated with the packing industry.

The chemists and their development of chemical control taught the packers of the United States how to handle their products. They made it possible to distribute their products over the world. In the phrase of Thomas E. Wilson, in an address before the American Chemical Society, Chicago, September 7, 1920: "They started in with refrigeration, with control of the curing processes, with control of the canning and have made it possible for this business to become one of the largest industries in the world."

Control of Quality

For chemical control made possible an organized control of the quality of products throughout the entire packing industry. Beginning with chemical control in the laboratory of the chemist, quality control was gradually extended from the purchase of livestock at one end to the finished product at the other end in the form of ham, bacon, sausage, lard, canned meats, choice beef, mutton and pork cuts, butterine, glandular extracts for medicinal use, surgical sutures, strings for musical instruments, glue, animal and poultry feeds, and fertilizer, the quality of all of which must be satisfactory to the buyer.

In one great packing company this matter of quality control has been worked out in this way:

> The details incident to these operations have required the development of the following quality control divisions, which serve not only as individual checks on quality, but as a check on one another and a combined co-operative control force in the interest of our company not only producing satisfactory quality in both edible, and inedible products, but, equally important, maintaining this quality on a uniform basis:

1. Control through purchasing units
2. Practical or operating department control
3. Scientific and technical control through a system of modern laboratories
4. Engineering control
5. Control through field sales forces
6. Co-operative sales and operating control.[8]

The quality of livestock bought by the packer is maintained by a well-organized group of buyers who have had years of experience in judging quality of livestock and meat. Quality control is applied to all other raw materials used by this packing company and is secured at each plant by the local purchasing department working under a general purchasing agent. This is one of the most important features in maintaining standard of product which is so vital to millions of consumers.

The method of insuring this is described by Mr. Wilson in these words:

> Our system provides that, regardless of the size and nature of a consignment of raw material, the receiving department must not receive it until after the approval of all control divisions interested is a matter of record in the receiving department. This may mean that a product must be held over after chemical analysis has been made, or, on the other hand, practical demonstrations of its merits in an operating way. In any event, each control division interested must carefully inspect the product and subject it to all tests and analyses necessary accurately to determine that it measures up to the standard set by Wilson and Company.
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> The operating division is the most important unit of control, as it starts with the raw material, whether it be livestock, cottonseed oil, or spices, and carries them through the many processes until they become finished products ready for the trade. This division is the custodian of millions of pounds of meat that are either in a fresh state or in the process of manufacture. It will be seen at a glance that there is no small responsibility resting upon those who are not only required to preserve the wholesome quality of these products, but further maintain the standard of uniformity in quality. This division is also charged with the

[8] Wilson, Thomas E., "Quality Products," *Management Engineering* (February 1923), Vol. IV, No. 2, p. 114. The following discussion of quality control is largely based on this article.

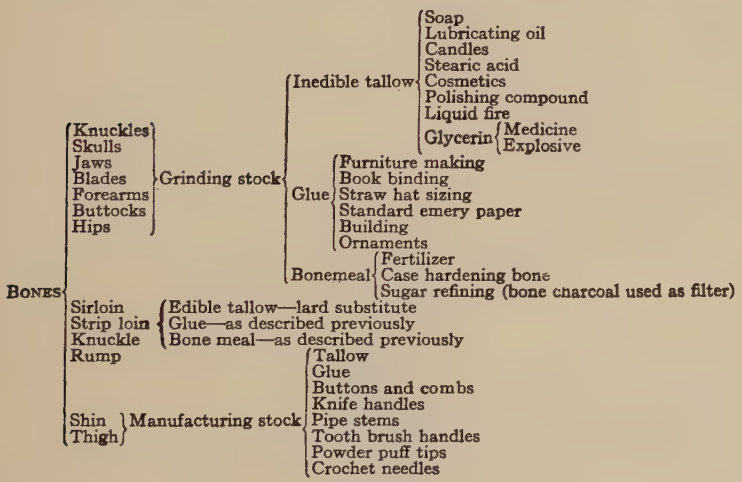
responsibility of packing and shipping the products. The work must be well done, as service through prompt deliveries has a vital bearing on quality of perishable products.[9]

The practical or operating department control is supervised by heads of divisions who have had wide experience and are well trained in checking details. For attention to minute details is the secret of insuring proper control of the quality of the product, and this care has resulted in methods which insure correct standards being made a matter of company record. Written instructions embodying them have been prepared so that the same quality can be reached in any plant of the company.

This remarkable achievement in control of quality is due to organization of all divisions of this company's operating force and that of many others, to secure quality, and it is due also to a spirit of co-operation in rigid adherence to standards, which is one of the admirable illustrations of the fact that the packing industry is a leader among progressive American businesses.

Packinghouse By-Products

The principal by-products, with their source and uses, are:[10]



[9] *Ibid.*, pp. 114–15.

[10] This table was prepared by Mr. G. L. Noble, formerly a member of Armour's Bureau of Agricultural Research and Economics.

- **Horns**
  - Combs
  - Hair pins
  - Barrettes
  - Buttons
  - Ornaments
  - Umbrella and cane handles
  - Knife handles
  - Fertilizer
- **Hoofs**
  - Outer shell
    - Buttons
    - Hair pins and barrettes
    - Fertilizer
  - Inner portion
    - Neatsfoot oil—harness, shoe, and special lubricants.
    - Stearin—soaps, candles, etc
    - Glue
    - Fertilizer
- **Hides and Skins**
  - All leather goods
    - Shoes
    - Lacing
    - Harness
    - Whips
    - Beltings
    - Bags
    - Suit cases
  - Drum heads
- **Bristles and Hair**
  - Plaster retarder
  - Artists' brushes
  - Curled hair for upholstering furniture and auto cushions
  - Paint brushes
  - Scrub brushes
- **Wool** (All woolen goods)
- **Intestines**
  - Sausage containers
  - Lard containers
  - Snuff containers
  - Gold beaters' skins
  - Fancy bottle caps
  - Drum snares
  - Tennis strings
  - Ukelele strings
  - Harp strings
  - Violin strings
  - Other kinds of musical strings
  - Surgical ligatures
  - Ox gall
    - Setting dyes, used in paints, dyes, laundries, and dry cleaners
    - Activates bile secretion
    - Gall stones for ornaments
- **Fats**
  - Oleomargarine
  - Soaps
  - Glycerin
    - Medicinal purposes
    - Liquid fire
    - Cosmetics
    - Polishing compounds
    - Explosives
  - Stearic acid
  - Red oil lubricants
  - Ointments
  - Special oil for leather dressing
  - Torpedo lubricating oils
  - Heavy lubricating oils
  - Illuminating oil
- **Meat Scrap and Blood**
  - Meat meal—stock feed
  - Blood meal—stock and poultry feed
  - Tankage—fertilizer
- **Glands**—48 preparations used by the medical fraternity to treat various diseases, such as rickets, goiter, mental backwardness, influenza, also in obstetrics, surgery, menopause, etc.
  - Pituitary—base of brain
  - Pineal—surface of brain
  - Thymus—neck
  - Pepsin—stomach
  - Spleen—spleen
  - Thyroid—neck
  - Uretic—abdomen
  - Suprarenalin—kidney
  - Ovaries
  - Corpus luteum—part of ovaries
  - Mammary
  - Pancreatin—pancreas
  - Parotid—neck
  - Parathyroid—near tongue root
  - Kephalin—brain
  - Lecithin—brain
  - Thromboplastin—brain
  - Red bone marrow—tonic

CHAPTER XVII

NATIONAL DISTRIBUTION SYSTEM FOR PACKINGHOUSE PRODUCTS

Early Trading in Provisions

Up to the period of refrigeration practically the entire commerce in meats in the United States was in mess pork and beef, and in lard and tallow. A tremendous volume of business developed, especially after the Civil War, but during this time the pork packers with more than local trade did not find it necessary to build any special distribution system. They confined their efforts to production and left the distribution of meats entirely to speculators and brokers. During the seventies and part of the eighties even the large packers, like Swift and Armour, confined their efforts largely to the assembling and processing of raw materials, trusting to the Board of Trade speculators and local jobbers to take care of the distribution of their pork products. The retail merchant and the consumer were left entirely out of the scheme of things. They might get their supplies regularly, irregularly, or not at all as far as the packer's efforts were concerned.

It was out of this situation that the system of trading for future delivery in provisions began in the sixties. The trading in futures in pork products began during the Civil War when the government wished to buy prime mess pork for later delivery. Before there was trading in futures, pork packing was considered the worst and most risky operation possible, because the packer himself had to carry his products until a cash demand came for them, unless the packers were able to break prices of hogs to a safe figure. Of course this specu-

lative feature sometimes enriched certain packers who were fortunate or shrewd in their guesses, but the system of future trading benefited each packer by enabling him to buy the raw material from day to day as it was sent in at the convenience of the producer and at the current prices without fear of loss, when otherwise he would only be in the market occasionally. With the trading in provisions futures, boards of trade entered into the packinghouse system of distribution, standardized their operations, and put them on a permanent basis. It is, therefore, important to consider this system which is in vogue today.

Board of Trade Functions

The general functions of boards of trade are well known, but it may be well to summarize here the statement of the Industrial Commission appointed by Congress in 1898 to investigate effects of speculation on value of farm products:

> 1. They localize industrial risks among a commercial class whose special function is to distribute surplus supplies over times and places of deficit in such a way as to lessen the uncertainty of producers and consumers.
>
> 2. They relieve producers and consumers from carrying a whole year's stock, enabling the farmer to convert his crop promptly into cash capital, and the latter to supply himself as his periodical needs may require without enhancing prices beyond the original rate of risks and returns of such capital investments.
>
> 3. Competition of speculative traders tends more than any other force to reduce profits of these agencies to a minimum per unit of commodity handled. Released from their economic functions it is to their interests to seek to reduce the risks of distribution to a minimum. By expert acquaintance with the conditions that involve risks, the hazardous elements are gradually limited, if not entirely eliminated.

Chicago Board of Trade

Of the boards of trade the Chicago Board of Trade has been the most important as an auxiliary to the meat packer in

the process of distribution, as a "clearing house or digestor for the trade," and a barometer of values.

The Chicago Board of Trade is so closely related to the packing industry that, if such relations did not exist, the industry would lose what constitutes, without any argument, one of the most important factors that makes for the success today of practically every packinghouse of any consequence in the United States.[1] For without the basis of values determined by the daily transactions on the Board of Trade, there would be no definite basis on which a packer could figure what his product was worth, and he would be speculating regarding its value instead of knowing absolutely the prices at which he can sell at least 50 per cent of his product.

For example, a packer may have a large demand for certain weights of hams and bacon, but he has to buy heavier hogs to get the smaller ones. The fat heavy stuff has no immediate sale, or it may be that some other packer has a brisk call for fat bellies, or "skin bakes," or some other kind of heavy pork cuts. These are sold on the Board of Trade and a buyer is found instanter, or after waiting a short while. There is one big hog plant in the Union Stock Yards, Chicago, which sells almost its entire product on the Board of Trade. One large packer takes nearly all of this company's fat stuff and heavy sides. The surplus of other plants is also passed into the brokerage channel for redistribution to the best advantage. The brokers and the Board of Trade necessarily become valuable adjuncts to the profitable existence of the provision trade in the United States.

Chicago Price a Basis

In 1912 when Mr. E. L. Roy of Chicago was visiting a Canadian plant, the sales manager received a bid by wire for a round lot of refined lard. Glancing at the close of the mar-

[1] "The Relation of the Chicago Board of Trade to the Packing Industry," by E. L. Roy, of Cross, Roy and Saunders, Chicago, Illinois. This was a paper read at the eighth meeting of the American Meat Packers' Association, Chicago, September, 1913.

ket, which had come a few minutes before the bid was received, he dictated a refusal and made a counter-offer, closing his telegram with these words: "Chicago market 15 higher." Down through Washington, California, back east through Colorado, Kansas, Missouri, in fact everywhere, the same basic value is used. There are but few manufacturers in the world provided with a market at the end of a wire every day in the year, where they can sell the product manufactured if the market pleases them, or buy what they may have contracted to deliver if they do not wish to manufacture it. In this particular the Chicago Board of Trade's relation to the packing industry is a most intimate and helpful one.

The Board of Trade frequently acts in the capacity of salesman for the packer. For example, a buyer today can purchase on the Board the main provision products dealt in, such as pork, lard, and ribs, for delivery in October, January, or even May. The product so purchased will be delivered to him as the month arrives. Special mention is made of this fact for the purpose of calling attention to the legitimacy of value of the future contract as made on the Board when a buyer wishes to provide for his requirements several months ahead. But it should be noted that the old-fashioned salt pork has declined in fashion and the demand for it has lessened. Hence there is now (1923) very little actual futures trading in it. However, the Board of Trade price quotation continues to be the basis of its value in the trade.

Daily Barometer of Conditions

Another very important department admirably handled by the Board of Trade which contributes largely to the packers' welfare, is that which furnishes daily reports in connection with the packing industry. Early every morning there are posted the receipts at, and shipments from Chicago of lard, cured meats, fresh meats, etc. This barometer of trade is of the utmost importance, and is generally a fair indication of the

movement of products from other packing centers. The Liverpool market in lard and cut meats is also posted daily, a great help to the manufacturer here and the buyer abroad.

An important function performed for the packer by the Board of Trade, and one which helps place the packing business on a sure foundation, lies in regulations adopted by the Board members, calling for uniformity in quality, weight, cut, trim, average, and package. To insure this uniform standard which its requirements demand, the Board maintains an inspection department in charge of a chief inspector, whose duty it is to furnish certificates of Board of Trade weights and inspection, whenever his services are demanded by seller or buyer of products coming into or going out of Chicago.[2]

Inspection System

This inspection system, which is separate from the federal meat inspection service, is a very important part of the selling end of the packing business, as the certificate of the Chicago Board of Trade is not only accepted, but frequently demanded, by practically every market in the world using United States meat products. This official inspector is frequently called upon to pass on the regularity of weight, packing, etc., of products traded in and very few are the instances where any dissatisfaction is found with his verdicts. In the event of such dissatisfaction, however, there is further provided by the Board, through the Committee on Provisions Inspection, a special court of appeal, before which all complaints may be brought, arbitrated, and finally disposed of.

A further aid provided for the packer under the direction of the Chicago Board of Trade is the registration of packinghouse products, beef, sheep, or hog products in store in warehouses declared to be "regular," for the storage of such property. The Board sees to it that before any warehouse shall

[2] See Rules and Regulations of the Board of Trade of the City of Chicago: "Requirements as to the Cutting and Packing of Hog Products."

be declared "regular," a bond with sufficient sureties subject to such conditions as deemed necessary by the board of directors of the Board, is filed in connection with such warehouse.

The Board appoints a competent person as registrar of provisions, whose duty it is to keep records of all warehouse receipts for packinghouse products stored in such regular warehouses. These receipts after being stamped "Registered" are negotiable, and all deliveries of beef, sheep, or hog products in store in the absence of special agreement, shall be by the delivery of registered warehouse receipts, accompanied by certificates of inspection previously referred to. One can see the very great saving in time that such a system affords.

Summary of Products Traded In

These are the main features of the Chicago Board of Trade relating to the packing industry. It furnishes any packer who will deliver standard produce, a regular market, sees that goods brought to that market are sold at the market price, affords him protection in the event of dispute, gives him daily information that he could not obtain in any other way, except at an enormously increased expense, and places his business in the front rank of commerce.

In addition to the main products quoted on the Chicago Board of Trade, mess pork, lard, and ribs, there are many packinghouse by-products that are dealt in, largely by brokers who also buy and sell the main products. Many of these brokers do a large business, e.g., in blood, digester hog tankage materials, fertilizer tankage materials, bone meals, cracklings, glue and gelatin stocks, hoofs, horns and manufacturing bones, hog hair, pigskin strips, etc. Much of this brokerage business brings in too great a duplication in the distribution of these products, which is needless and uneconomic.

The charge has been made that before modern large-scale distribution systems were built the packers in Chicago gradually became more interested in the Board of Trade, in specu-

lative operations rather than in the production of their business. Indeed, it was stated regarding some of them that they looked on their plants as places where the commodities were prepared to fill their speculative obligations. This was true to some extent. The directors of the International Packing Company, it would seem, did not for years do a legitimate business, but squandered money in puts and calls. It was this very fact, however, which caused its legitimate business of pork packing, for which the company was organized, to go to the wall.[3]

Several noted corners have taken place in provisions as in grain on the Board of Trade. One of these was the Armour pork corner in 1879.[4] Among others who indulged in speculation were B. P. Hutchinson, known as "Old Hutch," and later John Cudahy; but this attempt at cornering the market was the exception and a misuse of the institution which often resulted in loss. Due to the wise policy of the board of directors, this feature has been eliminated.

At present the Board of Trade outlet to market is relatively more important to the many hundred small packers than to the larger packers who have developed their own national distribution systems. Yet the larger companies use this agency freely for making purchases as well as for making sales. For example, the deliveries of Armour and Company amounted in 1914 to $769,328, in 1915 to $507,142, and in 1916 to $4,867,363, while their purchases for the same years were $568,657, $2,724,160 and $158,976 respectively. The deliveries of Swift and Company in 1916 amounted to $1,030,198, and purchases to $10,070,305.

New Distributing Agencies

When the process of centralization and shipment under refrigeration in the seventies and eighties began to lengthen

[3] *The National Provisioner* (Mar. 26, 1904), Vol. XXX, No. 13.

[4] Lloyd, Henry D., "Making Bread Dear," in *North American Review* (Aug., 1883), Vol. 137, No. CCCXXI; Denslow, Van Buren, "Board of Trade Morality," in same (Sept., 1883), No. CCCXXII; Taylor, History of the Chicago Board of Trade, Vol. II, p. 613.

the radius of the market, new agencies were employed to distribute packinghouse products. Indeed, there was an absolute need for some kind of marketing agency for handling fresh meats at the consuming centers. The wholesale grocers, it is true, had for a long period played a conspicuous part in the distribution of cured meats and other products of the packinghouses, but not being fitted for handling fresh meats, they soon lost their trade in the cured product.[5]

The need for a new marketing agency was at first met in some sections by a body of commission merchants and independent wholesalers. But the growing demand in the eighties for the distribution of fresh meats in enormous quantities, the dressed beef trade, having increased very rapidly, did not lend itself to the jobber system of distribution. This accounts for the fact that Swift and Company and Armour and Company, which were developing a nation-wide business, have never found the jobber system practicable for their business. For this reason branch houses and refrigerator cars were quickly and surely developed into great sales organizations.

During the rise of the dressed beef trade in the late seventies and eighties, as already described, G. F. Swift and other packers realized that the successful introduction of dressed beef into the markets of the country would depend largely on having local agents or consignees. Their services were important in introducing the goods and in handling them to the best advantage. The consignee was in a position to overcome the prejudice existing at that time against western dressed beef and his recommendation would go a good deal further than that of the packers' salesman or representative who might come in to deal with the trade directly. So for years in many places, firms and individuals, at first doing a comparatively small business, grew to be large factors in the packing trade and many of them became wealthy on commissions earned from the "consignee" business.[6]

[5] Federal Trade Commission Report, Pt. IV, Chap. II, p. 33.
[6] *The National Provisioner* (June 5, 1909), Vol. XL, No. 23.

Origin of Branch Houses

With the great increase in the volume and extent of the packing business and the development of their present sales organizations the methods of selling their products changed. Jobbers would not take anything except the staple provisions, so that in order to sell widely all their products, the bigger packers have found it necessary to have their own branch houses to deal directly with the trade. It was their experience also that this could be done at a lessened expense pro rata, but to some extent the bigger packing companies still use the consignee arrangement. In 1918 Swift and Company, had 17 regular consignees; Armour and Company, 22; and Morris and Company, 7.

The question as to which method, consignee or branch house, is best from the standpoint of producer and buyer is a broad one. There is no doubt that in a small city or point of shipment a consignee who has his own facilities in the shape of coolers and branch house equipment, who is well thought of by reason of his capital and general business standing, and who also handles other lines of products, such as country produce, fruits, etc., can give the shipper excellent service by reason of prices realized and the guaranteeing of profits. In such a case the result will not only be profitable to the packer, but it will be fully equal to the returns from a direct branch house. If the packer relies in a small place on a branch house he has to depend on hired help entirely, and he is in a locality where the volume of trade, at its best, is bound to be limited and where he has only one line of products to supply the trade. On the other hand, the consignee caters to various lines of trade and so reduces selling expenses proportionately, but in cities of large population, where the volume of trade is practically without limit, and especially where large lines of specialties and fancy brands of goods are in demand, the question of consigning or of selling direct is often a very difficult one for the packer to decide.

Brokers, Consignees, and Branch Houses

The consignee is, of course, a different factor from the broker who acts only as an agent between seller and buyer to close a deal and decide on details of quantity and prices.

Brokers formerly filled most of the orders for larger packers, and many packers still buy through brokers who fill their orders. Brokerage houses, however, are of greater importance to small packers. The branch house from 1890 on was more important for the larger packers than was the broker, and in fact has become the most important part of the marketing organization of the larger packers. There are in the United States some 1,327 of these branches, operated by interstate slaughtering companies. Of these the five larger packers own about 1,000. More than half the branch houses are located in the Atlantic seaboard states and a large proportion of these are in the North Atlantic states.[7]

The branch house is a natural growth of concentration and large-scale production in the packing industry. Just when the first branch house appeared is not certain. A general date which can be taken as a starting point is 1880, for about that time W. H. Noyes, of Swift and Company, was making arrangements with various partners of G. F. Swift throughout the East for developing the business. Swift and Company for a long time preferred such distribution through consignee partners with decentralized control. Armour during these very early years employed but one traveling salesman. This man marketed in a wholesale way all the principal cuts. It was not unusual to sell one wholesale jobber from 30 to 60 carloads of products at one time. This one salesman made a practice of going through the East once a year to solicit the trade.[8] However, when beginning a little later to establish definite sales outlets, Armour believed in a centralized policy for control of branch houses.

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[7] Federal Trade Commission Report, Pt. IV, Chap. II, p. 32.
[8] *Armco* (July, 1914), Vol. III, No. 7, article by Everett Wilson.

The first branch house of Armour and Company was established in New York in 1884. Up to that time Armour products in the East had been sold through H. O. Armour and Company. The New York branch house was designed to serve merely as an outlet for canned meats which were being produced in constantly increasing quantities.[9] It led, however, in a short time to the establishment of other branch houses for the sale of smoked and pickled meats.

Branch House Definition

The first regular branch house, in the present sense of the word, as a place where meats and meat products are sent from a central packing plant for local distribution to the retail trade, where cold storage is provided and, in a few cases, where some of the final processes are carried on, was established in Albany in 1885. There facilities in the shape of smokehouses were provided for smoking hams, and bacons were received in pickled form from the West. All of this local smoking of pickled meats from the West had previously been done by consignees and brokers who did their own smoking. The Albany house was the first real step taken by Armour and Company toward getting away from the jobber of sweet pickled meats, going beyond the former preliminary treating of products, and disposing of them direct to merchants in thoroughly finished form. The second Armour branch house was the result of taking over a brokerage agency in 1886.

By 1888 there were 11 Armour, 9 Morris, and 1 Cudahy houses. The number of Swift houses is not known. Beginning with the next year, the number of these establishments began to increase rapidly, and by 1889 the 5 larger packers had 544 houses, by 1908 the number was 887, and in 1916 it was about 1,000.[10] The branch houses soon required new methods and as early as 1889 systems of branch house accounting were

[9] "Armour's Distributing System. Outline of Origin and Growth," in *Armour Magazine*, Vol. V, No. 2 (Feb., 1916).
[10] Federal Trade Commission Report, Pt. IV, Chap. II, p. 33.

devised and put into operation, and three years later in Armour and Company a branch house credit system.

The Federal Trade Commission summarizes the branch house organization as follows:[11]

> These branches are something more than selling agencies. They are factories in a way, where, for example, meats are cured and sausage manufactured; they are cold storage plants for holding stocks for limited periods; and so far as goods are withdrawn from them to ship to surrounding territory or for supplying car-route cars, they may not improperly be called warehouses; but primarily they are wholesale markets.

In the case of Swift and Company and Armour and Company there are over 800 branches and over 6,000 salesmen. As regards Armour and Company, in addition to 16 complete packing plants, 59 of the branch houses conduct some slaughtering on their own account as well as manufacture sausage and maintain smokehouses for the smoking of hams and bacon, and cooking of hams under government supervision. One-third of the branch houses maintain mechanical refrigeration plants and another third are equipped with natural ice refrigeration.

Branch House Organization

Each of the branch houses nas its own manager, office force, and sales and delivery organization. The branches are grouped into districts—in the case of Armour and Company, some 25 in number—under the supervision of a district manager, or field superintendent. The field superintendents in turn report to the general branch house superintendent's office in Chicago. Each branch house is, therefore, an integral part of the system of distribution.

The meats, especially carcass meats, are often handled by the branch house on a commission basis, the commission ranging from 48 to 65 cents per hundred, but this does not mean that the manager is acting in the capacity of commission merchant. He, like all the other branch house employees, works on

[11] Federal Trade Commission Report, Pt. IV, Chap. II, p. 34.

a salary basis, and the commissions merely supply means for paying the expenses of the house. It is desirable from the company's point of view to make the manager feel that the business is his in the sense that he must make it pay. Wilson and Company, Inc., since 1916 has followed the plan of assigning a definite capital for each branch, according to its needs, and charging interest thereon.

The branch house manager is charged, or "pays" prices fixed absolutely by his company for goods of the company's production. He is not at liberty to buy where he will, and is not free to pursue his own selling policy, but is subject to instruction from the district superintendent, the district inspector, and the managers of the various departments from which he draws supplies at the plant. The co-ordination of the different units in their selling organizations and the selling organization with the manufacturing end of the business is made an objective by the packers.[12]

Real Scope of Branch Houses

These houses, however, are something more than branches. They constitute an important part of a great system of production and distribution. To say, therefore, that Swift and Company has 415 branch houses or Armour and Company has 370 such houses and employs in connection with them more than 3,000 salesmen, does not disclose the full scope of the big packers' position in the wholesale market. The manner in which the location of branch houses is decided and the houses are supplied with products to meet every grade of want, the opportunities they furnish for gathering market and trade information, the way in which they are connected by every means of communication with one another through the district superintendent and with the central office by private wires, the mails, the telephone, and by weekly and monthly reports, gives them a selling efficiency more than proportioned to the number

[12] This is the case with Morris and Company.

of outlets they furnish.[13] The general branch house superintendent is not necessarily a general sales manager. For example, Armour and Company has no general sales manager. The general superintendent of branch houses does not concern himself with specific distribution of the products of any particular department. Something like the functions of a general manager, however, are supposed to be performed by each of the 25 field superintendents in his own territory.

Each department of the business has its own sales manager in the Chicago general office. There are some 25 of these, each corresponding directly with the field superintendents or branch house managers and individual salesmen. Each department promotes among the superintendents, managers, and salesmen of the branch houses the interests of the particular products that come under the jurisdiction of the individual department. In addition to the regular branch house salesmen, each department has its own specialty men whose operations are not confined to any particular branch house. The canned meats department, for example, has 53 specialty men in the whole United States, educating regular salesmen and reinforcing their work. The soap department has some 125 men and these men simply supplement the work of the regular branch house organization.

In addition to the full-fledged branch houses, some of the companies have outlets closely associated with the branches and subsidiary to them. Swift and Company, for example, has a considerable number of "substocks," that is, houses with an organization in all respects like the branch house, except that they have no accounting department. Sales tickets and reports of all kinds are sent to a neighboring branch, through which all accounting to the district office and the Chicago office is done. In 1918 the company had 39 of these substocks, 24 of which were located in the South and Southwest.

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[13] For description of a typical branch house of the Jacob Dold Packing Co., see *The National Provisioner* (Feb. 16, 1908), Vol. XXXVIII, No. 7.

Other Outlets

Still another outlet closely associated with the branch house system is found in the storage and delivery houses. These are merely the establishments of local merchants who enter into contract with the packing company to store goods as shipped and to deliver them to customers secured by the company's salesmen attached to a branch house having jurisdiction of the territory. The storage and delivery service is performed on a percentage basis.[14]

Besides the branch house system the packers have access to the markets by all the avenues open to their competitors, such as the hotel supply companies, some of which they own. The hotel and restaurant trade seems to be a part of the food distributor's business that requires special care. It stands midway between the retail and the wholesale trade. In character the hotel is an ultimate consumer and might be expected to buy its supplies from retailers, as other consumers do. From the point of view of volume and economy in delivery it may, and often does, surpass all but the largest retailers and may claim the right to buy at wholesale prices.

Cold Storage Facilities

A factor indispensable to the proper functioning of branch houses, substocks, storage and delivery houses, and hotel supply companies is cold storage. There were some 424,968,313 cubic feet of cold storage space in the United States in August, 1918. Of this the bigger packers had about 25 per cent of the total. They also have a considerable amount of cold storage space largely used for chilling meat in connection with their packing business. The bigger packers' cold storage space is used for storing and holding their finished meat and other products till they are sold.[15] Some of this storage is located at or near their packing plants, but a large part of it is distributed over the

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[14] Federal Trade Commission Report, Pt. IV, Chap. II, p. 37.
[15] *Ibid.*, Pt. III, Chap. III, pp. 129-130.

country as a part of or in connection with their branch houses. Most of the branch houses have large cold storage plants for the goods they receive, and many have surplus space to lease or let. In addition to the cold storage at, or near, their packing plants and in connection with their branch houses, the big packers have many cold storage establishments in the large cities, principally the eastern seaboard cities, which they use for long-time storage and for storing for export.

In ordinary times the securing of cold storage space is not a serious problem with the smaller packers, but a few such packers who shipped to the eastern cities during the recent war had some difficulties in securing refrigerated storage space, and indeed at that time the big packers also had the same difficulties. Ordinarily, however, in the large cities there is available to the smaller packer sufficient cold storage facilities to accommodate his current needs, though often his storage is not conveniently located for the needs of his business. In many of the small cities and towns cold storage facilities are not available to the smaller packers, so they must, if they do business in those towns, sell directly from the cars, whereas the big packers have their branch houses with cold storage equipment.

Cold Storage and Refrigerator Cars

The question of cold storage is one of hygiene, and the hygiene of the storage of meat products is closely allied with the hygiene of the transportation of these products. The principles of hygiene which guide to correct practice in storage guide also to correct practice in transportation. This leads to the subject of the development of the private refrigerator car lines. In this matter of transportation the practice cannot be the same as in stationary storage hygiene. A storage warehouse is not rigorously limited in height, weight, spaciousness, and all details of construction and management, but the car used for refrigerator service must yield to limitations in all

these things. Since, therefore, neither storage facilities nor hygienic control during transportation can ever equal those in stationary storage structures, it follows that the first and distinctive demand for hygiene is rapid transportation. The other requirements are naturally those common to all storage places for food products, namely, that only properly selected and prepared foods be received at all and that there must be maintained cleanliness, dryness, and an even low temperature.[16]

Fresh dressed beef after it has been inspected by government officials and is ready for transportation to branch houses or on car routes is placed in a refrigerator car. This is of the standard form of the ordinary large box car in current use, but one notices a difference in the massive tight fitting doors, in the heavy insulated walls, and finally in the clear varnished surface of matched boards which line the interior. Parallel rows of galvanized iron piping attached to the roof receive hooks from which hangs the meat. At the extreme end of the car are the ice bunkers, tanks of galvanized iron of varying form, but in any case extending from the roof nearly to the floor. Access to the interior of the ice bunkers is only through hatches on the outside of the roof, and drainage is carried off by pipes through the floor. Thus ice compartments and meat compartments are entirely separate, and the cold air which passes over the meat comes from a galvanized iron surface and not directly from melting ice. A board partition across the end of the car, several inches in front of the bunkers, but extending to within only about a foot of the floor and roof, protects the meat nearest the bunkers from freezing, and promotes circulation of air throughout the interior. In passing it may be noted that a new way to cool refrigerator cars, the automatic brine circulation system, has recently been tried out by Wilson and Company, Inc.

[16] Chapin, Robert M., Senior Biochemist, Bureau of Animal Industry, U. S. Department of Agriculture, in Transactions of Fifteenth International Congress on Hygiene and Demography (1912), Vol. V, p. 21.

Loading Beef in Cars

The cars, which have been thoroughly cleaned and aired, are "precooled" before use by keeping the bunkers filled with a mixture of ice and salt for a day or two, so that at the time of loading, the interior temperature is close to or even below the freezing point of water. The car is run beside a platform upon which opens a door from the cooler, each side of beef swinging from a wheeled hook traveling upon an overhead rail. To lift the side of beef off, carry it in, and hang it up, takes so little time that exposure to an unrefrigerated atmosphere has been counted by seconds.

Once inside, the beef is packed compactly to prevent chafing when the car is in motion. There is plenty of space at top and bottom for air circulation, and of course innumerable vertical channels between. Very commonly the car is not filled solidly with beef, but carries a mixed cargo—dressed lamb, pork cuts, cured and smoked meats, lard—in fact, most packinghouse products. Such products as hides, bones, horns, hoofs, fertilizer, are of course shipped otherwise than in refrigerator cars. This system of loading tends to overcome one drawback to the refrigerator car, namely, different temperatures at different points in the car. Nearest the ice bunkers the temperature may be below freezing, and at this point can be placed such products as either demand or are not injured by a freezing temperature. Again, at the center of the car the temperature may be higher than is desirable for fresh beef, but low enough for the storage of lard and cured meats.

The car and every article going into it are subject to inspection by the Bureau of Animal Industry, and a certificate stating that the product has been inspected must be delivered to the railroad company, along with the shipment. In the large centers trains are daily made up of such cars, gathered from various establishments and hurried east, requiring about three days from Chicago to the seaboard, some 1,200 miles. The cars on this trip are iced three times with an approximate mix-

ture of ice and salt, at depots maintained for the purpose, so that the beef arrives at its destination at a temperature very little if any above that at which it left the cooler. It is unloaded and run into a cooler and subjected to inspection.

In a previous chapter the origin and early development of the refrigerator car was traced. It was the general use of the refrigerator car that induced the building of branch houses at advantageous points. These houses did no killing, but received the product from the car and stored it in refrigerator rooms or "coolers," until it was shipped to the local trade. It has been seen that, due to the hostility of the railroads, those few packers who were trying to introduce dressed beef into the markets of the country were forced to build and maintain their own refrigerator cars as a part of a national distribution system. In the course of years it was found desirable to form private car lines, as, for example, the Armour Car Lines and the Swift Refrigerator Transportation Company.

Why Packers Built Own Cars

The principal inducements for packinghouses in developing a national market to own the equipment were summarized by Commissioner Garfield in 1905 as follows:

> (1) To secure adequate facilities—both as to number of cars and refrigeration service—and thus avoid delays and other inconveniences, which might occur if railroad companies were exclusively depended upon. The advantages of private cars are partly due (*a*) to the perishable nature of many products, which makes necessary an ample supply of equipment in order to secure prompt transportation, (*b*) to the uneven movement of many such products at different seasons of the year, as a result of which it is stated that the railroad companies do not provide sufficient equipment to handle the traffic when at its maximum; (*c*) an alleged indisposition on the part of the railroad companies to give proper care to cars employed in such services.[17]
>
> (2) To secure the mileage payment allowed by railroad companies for the use of such cars.

[17] Garfield Report, pp. 271-272.

(3) To secure incidental profits, particularly those arising from refrigeration. This applies, however, only to companies also owning icing stations.

The most obvious problem arising from the use of refrigerator cars in the distribution of packinghouse products is the relation between the private car lines and the railroads. Private cars are a recrudescence of the earliest practice when railroads were expected to furnish the roadbed and motive power and the shipper the vehicle.

For almost 40 years a struggle between the packers and the railroads has gone on, the packers seeking to extract higher mileage payments and other transport concessions, and the railroads attempting to keep down their payments for the operation of private cars.[18]

Refrigerator Car Efficiency

The efficiency of operation of refrigerator cars can be seen from the fact that the 18,052 cars operated by the larger packers in 1914 made an average of 80.3 miles per day, while the 16,599 cars in 1917 averaged 80.8 miles. The Federal Trade Commission comments on this achievement in these words:

> Eighty miles per day throughout the year represents a very good movement for refrigerator cars even in normal times, yet this rate was maintained by the packers during 1917. Terminals were congested and the unloading of cars was therefore delayed. Embargoes and constantly changing priority of orders, a shortage of steel, coal and other materials, and severe storms and cold weather added to the railroads' difficulties in handling the business offered them. In the face of all these obstacles the big packers' cars were handled in the usual efficient manner.[19]

[18] Federal Trade Commission Report on Private Car Lines, Chap. III, p. 43. Chief among the present factors of railroad operation of private cars are the following: Mileage and per diem payments, commissions, refrigeration and icing, car service, peddler cars, demurrage, Master Car Builders' Rules, mixing rules, and minimum weights.

[19] Federal Trade Commission Report on Private Car Lines, Chap. II, pp. 92–93. The average miles per day for the cars operated by the larger packers during 1917 ranged from 76.9 miles for the Swift Refrigerator Transportation Company, to 104.3 miles for the Cudahy Packing Company. The very high rate for the Cudahy cars is in part due to the fact that this company considers its cars are in actual service only 292 days a year; while the others consider their cars operate from 309 to 340 days per year. Some time is of course normally lost in repair shops.

The cars of the smaller packers did not make as good a showing, averaging some 72.1 miles per day in 1914, and 54.5 miles in 1917. "The difference is accounted for in part by the fact that the larger packers' cars have on the average a longer run than the cars of the smaller companies." The movements of the former are also traced by the traffic experts of the larger packers. The greatest difference was in the trunk line territory between Chicago and the Atlantic seaboard.

Contracts between railroads and packing companies have been entered into with the thought of increasing efficiency. These contracts are of three kinds: (1) agreements between shippers owning private cars and railroad companies, in which the shippers usually promise a certain amount of traffic and the railroad companies fix mileage rates and also maximum freight rates on goods transported; (2) contracts between private car companies (which are not also shippers) and railroads, under which the railroads pay certain commission on the freight rates over and above the regular mileage rentals, on goods transported in the car companies' cars over the lines of the railroads; and (3) contracts by which the railroad promises to use exclusively the cars of one particular private company for some particular class of traffic. This last is called the "exclusive" contract and is now out of date.[20]

Refrigerator Car Earnings

Earnings of the refrigerator cars have been a source of considerable profit in themselves to the packing companies, though not the reason for their continued ownership of them. In order to compute these it is necessary to have the following data: (1) the mileage rental, (2) the average daily mileage of cars, (3) cost of cars, and (4) expenses. Taking all these items into consideration, in 1904–1905 refrigerator cars used

[20] In connection with this topic see: Celd, L. D. H., Private Freight Cars and American Railways, pp. 91–92, 140, 147; Garfield Report, p. 272; *Railway Age*, Vol. XXXV and XXXVI, articles by J. W. Midgley; Federal Trade Commission Report on Private Car Lines, p. 106.

in the shipment of dressed beef and provisions earned from 17 to 20 per cent on their value. In 1912 it appears that the refrigerator car lines of the larger packers made an average profit of 6.8 per cent on the investment. In 1914 the average was 3.8 per cent, and in 1917, 4.6 per cent. For the six years the average rate for all the car lines of the larger packers was 5 per cent. Among the smaller packers engaged in interstate trade the Kingan Refrigerator Line netted 4.7 per cent a year on the total investment for the six years, and 8.3 per cent on the basis of the capital stock issued.

Several factors contributed to the decline in the percentage of return on the investment in the last fifteen years. Among them were the increased cost of maintenance, repairs, replacement of parts and cost of building new cars. Depreciation is a larger item in consequence and overhead expense is slightly greater. There was until the recent increase in the mileage rate paid for the use of refrigerator cars from three-fourths of a cent to one cent per mile, no increased revenue to offset the added expense, except through expedited movement of cars adding to the mileage returns.

Peddler Car Routes

To move their products quickly and in good condition on regular schedules the larger packers have developed a system of refrigerator car routes, or "peddler car" routes, as they are called, which taps a market outside the great urban consuming centers of the country which is untouched by the branch houses proper because its population is too sparse to warrant it. These car routes are mostly used as a distributing method in the great livestock producing and feeding regions in the prairie states from Oklahoma northward, including the states of Kansas, Missouri, Kentucky, and Iowa.[21] In these states more than 16,000 towns are reached, for the cars can be run wherever there are tracks and new markets are easily developed at small

[21] Federal Trade Commission Report, Pt. I, Chap. III, p. 143 *et seq.*

expense. Nearly 9,000 towns are thus reached in the seven states neighboring the former tier on the east—Wisconsin, Michigan, Ohio, Indiana, Kentucky, Tennessee, and Arkansas.

The subject of these peddler car routes from the point of view of physical distribution of the product, divides itself naturally into two parts, one dealing with the packers' arrangement for the delivery of less than carload shipments, the so-called "peddler car service," the other with carload shipments, especially to branch houses. The car route sales of the larger packers amounted to about 775,000,000 pounds of food during 1916 A relatively small portion of this was delivered by express or other equipment supplied by the carriers; but the bulk of it was delivered to thousands of towns in all sections of the country by refrigerator cars, mostly owned by the packers.

How Peddler Cars Arose

The term "peddler car" had its origin in an early practice of selling meats and other perishable foods from cars en route, a practice no longer followed so far as the distribution of meat is concerned. At present the car routes of such an organization as Armour and Company radiate from various headquarters, such as Chicago, Kansas City, East St. Louis, Omaha, St. Joseph, and Fort Worth, but this is the result of steady and persistent growth. In the early eighties, at a time when branch houses were in their infancy, Armour and Company was looking for a method of marketing the increasing supply of hams and lard. It was felt that some way must be found to realize on the consequent increasing supply of fresh cuts, such as pork loins, Boston butts, spare ribs, etc. Distant points were of no avail on account of lack of refrigeration service, so a salesman was sent out from Chicago with a carload of this fresh product to peddle out to the small town meat market men who met the train. Sometimes the car would cover 200 miles before it was cleared, and sometimes only 70 miles. The trad-

ing was worthy of bigger business. Of course all products were sold in original packages, but it required agility, as the salesman had to be through when the train gang had finished unloading the freight for that point.

In 1887 the first two regular car routes were established by Armour and Company, one in southern Wisconsin and Minnesota and the second in northern Indiana. At first all the product was peddled, no part being sold previous to shipment. The routes established were not as now along strips of railroad studded with small towns, for it was considered that better results could be obtained if the cars traveled in circuit fashion, starting out and winding up at the point of shipment. This growth of car routes made possible a little later the establishment of branch houses at many places as the economic need arose.

Peddler Car Procedure

The peddler cars are loaded in station order by the packers' employees at the loading docks of the packinghouse with orders secured by traveling salesmen, through the mail, or otherwise. The contents are checked, according to rule, by railroad employees. The cars are iced by the packer and when re-icing is necessary it is done at his expense. Loaded cars are switched to the interchange tracks of the receiving carriers. If, as is usually the case, a car is not to break bulk until it has reached some distance from the point of shipment, this car is put into a train with other cars entitled to expedited service and forwarded to, or near, the town where the peddling route begins. The train may thus carry several meat cars 200 or 300 miles as time freight, and then be broken up at a division point to go into way-freight trains, each with its one or more meat cars. The consignments to the various stations are unloaded by the railroad employees.

The haul for a route car varies greatly in length, from 25 or 30 miles, to 900 or more. A typical car route in the Central

West involves a haul of from 250 to 300 miles in length. The number of towns on the peddling route varies from 2 or 3 to 15 or more. Many towns not reached directly by the packers' car are served by it, nevertheless, by transshipment at junction points, or to points beyond the final destination of the car. From the end of the route the car, usually empty, is hauled back to the plant, the packer receiving mileage on the movement of the car, both loaded and empty.[22]

Somewhat analogous to the extensive car service furnished by each of the big packers for his exclusive use, is the scheduled refrigerator service provided by many carriers on some parts of their lines for the general public, including the packers who often make use of it. The freight rate is the same whether shipment is moved in a peddler car or in a railroad scheduled car. In all cases the rate on each consignment is the less than carload rate from place of origin to destination. In order, however, for the packer to secure the special service that goes with the exclusive use of the peddler car he gives certain guarantees as to weight or earnings, or both.

Use of Motor Trucks

To turn from the railroad transportation of meats, to that by wagon, for short hauls, probably the most significant feature is the constantly extending use of motor trucks.[23] Better protection for the meat through the possibilities of heavier construction and far more rapid transit than by horse and wagon, are other important hygienic advantages of the motor truck. The trucks used by the large establishments are usually of the van type, with no opening at all in front and with tightly closing doors in the rear. The meat is thus surrounded with wooden walls which, being specially insulated, protect it from the outer heat as well as from moisture and dirt, so that it may

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[22] Federal Trade Commission Report, Pt. IV, Chap. II, pp. 57–58.

[23] For more detailed treatment of the use of autotrucks by the packers, see *System Magazine*, Nov., 1919, "Jobs that Motor Trucks Do Better," by R. A. Clemen; also publications of the Institute of American Meat Packers.

be delivered in prime condition as far as 30 miles away. For loading, the trucks are backed to a platform upon which opens a door from the cooler, and the beef is carried out on the shoulders of men dressed in clean gowns or provided with clean white carrying cloths. The floor of the truck is either strewn with fresh straw or covered with clean canvas on which the meat is compactly piled.

Fresh carcass meats (i.e., other than fresh beef subject to inspection by the federal government) are handled in essentially this way. Small cuts, such as pork loins, are wrapped in non-absorbent paper and crated before shipment.[24] Boxed, barreled, or crated goods and cured and smoked meats are naturally much less susceptible to outside influences than is fresh meat, yet the bulk of such products is handled in practically the same way as fresh meat. Quality and selling value are thus kept at the highest point, and since in any event refrigerator cars and vehicles of special type must be provided for fresh meats, the large establishments generally find it good business policy to use the same cars and vehicles for practically all their products. When shipments of small cuts of fresh meats must be made over considerable distances and in less than carload lots the ice box is employed. This is a rectangular galvanized iron box, provided with a tight cover and fitting into a similarly large shaped, but considerably larger wooden box. The space between the two boxes is packed with crushed ice which may be renewed as occasion demands. Shipments of this sort are common on inland waters as well as by rail.

The significance of these auto truck routes is seen when it is stated that 20,836 towns are reached by Armour's auto truck system, about one-fourth in the south central states and one-fifth in the north central states. In New York State there are over 1,000 Armour's truck towns and also in Pennsylvania and Virginia. In Texas there are nearly 1,600.[25]

[24] Chapin, *op. cit.*, p. 22.
[25] Federal Trade Commission Report, Pt. I, p. 144.

Large-Scale Marketing Efficient

While many packers do a business within a rather short radius, the industry has tended constantly toward large-scale centralized organizations of marketing for supplying the needs of the national and international meat trade. The question now arises: Is this large-scale organization of marketing for national and world markets in the interest of the public? This subject was discussed at the American Economic Association, December 31, 1919.[26] It was pointed out by Mr. L. D. H. Weld of Swift and Company in an able exposition of the subject, that the packing industry represents large-scale marketing in these ways: (1) Each of the large packers does a large volume of business in its principal products, meats; (2) each has undertaken the marketing of other products than strictly meat foods, although the extent to which this has been done varies for the different packers; and (3) the large meat packer represents a more direct system of marketing than is found in most trades in that "he does his own jobbing" and sells direct to the retail dealer. There is, therefore, in addition to large volume, the branching out into other lines, and the integration of the marketing processes.

The packing industry is a combination of manufacturing and selling. There is a real need for large manufacturers in order to bring about the greatest possible utilization of by-products and it is also necessary to have the plants large enough to be able to absorb the fluctuating receipts of livestock that come to market. Many small packers are called "in-and-outers," because they buy when the market looks right to them and stop buying when conditions look unfavorable. The large packer varies his buying to a certain extent, but on the whole makes it possible to absorb the receipts of livestock that come to market, whether great or small.

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[26] Proceedings of the American Economic Association, 1919. The argument for large-scale marketing is based principally on the statements of Weld, L. D. H., Manager, Commercial Research Department, Swift and Company.

Need Large Distribution Organizations

Important as it is to have large manufacturing companies, it is equally important to have large distributing organizations in the packing business. The greatest advantage in a large distributing scheme organization is that the large packer in Chicago, or other western cities, can keep directly in touch with trade conditions, and can distribute his highly perishable meats to various markets more efficiently in accordance with varying demands than was possible when he depended upon outside wholesalers for his market. The reason that he can afford to do this is that he has such a large volume of business to do through each branch house that the cost of operating these branch houses is reduced to a minimum. Swift and Company's cost of operating branch houses is only about 4 per cent of the sales, and this includes an overhead administrative charge from the Chicago office.

It is clear that no small packer in the West can afford a comprehensive sales organization in the East. A small packer might have enough business to maintain one branch house in New York, but unfortunately this one branch will be wanting choice cuts of beef one week and cheap cuts of beef the next week. Demand for beef will be falling off in New York when livestock receipts are increasing in the West, or vice versa. In other words, the western packer must have a large number of distributive outlets in various consuming centers before he can market his meats efficiently.

This is one of the reasons why the larger packers have branched out into the handling of other commodities, but there are other reasons as well. In the first place, long ago they found that in their refrigerating equipment in the form of storage houses, refrigerator cars, and cooling rooms in their branch houses, they could handle to advantage such commodities as butter, eggs, cheese, and poultry. They found that they had to add some overhead expense in the way of administration to their Chicago headquarters, but that much of the exist-

ing administrative machinery could also be utilized. These goods could be sold to the same class of retailers by the same salesmen and delivered in the same delivery trucks. In general, the same accounting force could attend to the making out of bills, etc. In other words, they could increase their volume of business without a commensurate increase in overhead expense for administration and for physical equipment. This increased tonnage not only made it possible for the larger packers to handle these related commodities expeditiously and economically, but enabled them to have distributing houses for meats where otherwise the tonnage would not be sufficient, and in general this increased tonnage decreased, or at least kept down their selling expenses on meats. At present the marketing expenses, including freight on their goods, constitute well over half of the total expenses of Swift and Company. In that sense, this company is more important as distributor than as manufacturer.

Distributing Functions of Packers

To summarize the functions of the packers, in assembling, the packers are in touch with the producing sections. They have established their assembling plants for butter, eggs, and poultry in such states as Iowa, Missouri, and Kansas, thus permitting them to assemble to the best advantage, and at the same time to furnish a never-failing market for producers. In storing, they have warehouses and refrigeration facilities in connection with their numerous packing plants, and they have refrigerator cars and refrigerating facilities in connection with their many branch sales houses, which can be used for these products, as well as for meats.

In financing, the packers are borrowing from banks throughout the country in connection with their business, and can easily use the same sources of credit for their other products. As for the assumption of risks, they are in a position to minimize the risks involved, through having a nation-wide

organization which is in constant touch with the changing conditions all over the country, and they have such a wide distributive outlet that they can store goods only to satisfy their own trade requirements, rather than as purely speculative ventures.

When it comes to grading, sorting, and packing, the packers reduce the number of times that goods must be sorted and rehandled by their direct shipment from assembling plants in the West to branch houses in the East, and they are in a position to bring about a greater uniformity and standardization of grades than is customary. As for the selling function, the packers utilize their sales organization in such a way as to reduce unit selling expenses. In performing the functions of transportation they bring about a more exact distribution of goods by having control of their own refrigerator cars, and they utilize the same delivery trucks that are necessary for carrying meats to the door of the retailer.

The advantages the packers have over the ordinary distributive machinery in the handling of these products are obvious, and yet they are not so great, measured in dollars and cents, as would appear at first sight. They still have to render all the functions that are performed by other middlemen. They do not aim necessarily to undersell them, and yet it is a fact that they set the pace in competition. When a purchaser in New York wants a large quantity of eggs, Swift and Company, for example, is not only likely to be able to make the best price, perhaps only by a fraction of a cent per dozen, but it is likely to have goods available in New York or en route from some Kansas point, which will just fill the bill. The advantage is perhaps even more in respect to service than it is in respect to price.

Benefits Both Producer and Consumer

Through their central organization, which is constantly in touch with hundreds of sales outlets, packers are able to dis-

tribute most efficiently their supplies in accordance with varying demands, and they are more likely than perhaps any other distributor to have goods on hand at any particular point. This all means better organization, more scientific marketing, and greater benefits to both producer and consumer than are possible under an organization consisting entirely of small units.

The different packers have had varying opinions as to the economies obtainable by branching out into other lines. Armour and Company, for example, during the war went into such products as coffee, rice, cereals, etc. Outside of butter, eggs, cheese, and poultry, Swift and Company has taken on practically nothing but canned goods, and a little dried fish. In this connection, there is left out of account the manufacture and sale of leather, soap, oleomargarine, fertilizer, etc., which are industries that carry to a further degree of manufacture the by-products of animals.

The outlines of the modern distribution system of the packing industry were completed by the middle nineties. By that time it was clear that a packing company to give efficient interstate service must develop a branch house and refrigerator car organization. Without that it could and would be only a local business. The story is told of Henry Botsford in Chicago, who sent out a circular to the directors of his company asking for a consideration of this problem. He declared in the circular that if the company went ahead it must have a modern system of distribution. If it did not have such a system it would never become important. The directors decided against the forward step. Botsford's prediction came true.

CHAPTER XVIII

COST ACCOUNTING IN THE PACKING INDUSTRY

Practice Differs from Others

The cost finding and accounting practices in the packing industry have been often misunderstood simply because they apparently are so different from practices in other industries.[1] Much confusion and some criticism in the past has resulted from a lack of understanding of the principles underlying packinghouse cost finding and accounting procedure. The differences are not differences of principles, for the practices in this industry are based on sound accounting and business principles. The differences in the accounting are the results of the diversity in the character of the operations performed. The Standardized Cost Accounting Committee of the Institute of American Meat Packers, which has made a special study for some time, working out suggestions and recommendations as to the handling of packinghouse cost and accounting procedure, has confined its efforts largely to the specific problems arising in the industry.

Following the principles worked out as a result of that careful study, the present chapter has for its purpose the explanation of some of the peculiarities in packinghouse accounting procedure and the contrasting of these practices with those prevailing in other industries. In this chapter also an effort

[1] The material for this chapter has been furnished through the courtesy of Mr. J. H. Bliss, Chairman, Committee on Standardized Cost Accounting, Institute of American Meat Packers. For further study reference is made to the following sources: The Theory of Packing House Accounting; Tentative Draft of Proposed Accounting Instructions on the Cattle Business; and Tentative Draft of Proposed Accounting Instructions on the Hog Business—all three studies being prepared by the Committee on Standardized Cost Accounting of the Institute of American Meat Packers. See also Putnam, George E., "Joint Cost in the Packing Industry," *Journal of Political Economy* (Apr., 1921), Vol. No. 4; and "Unit Costs as a Guiding Factor in Buying Operations," *Ibid.* (Oct., 1921), Vol. XXIX, No. 8.

is made to contrast and explain the cost finding and accounting procedure prevailing in the packing industry with that of other industries, without entering into an exhaustive or detailed discussion of either.

Three Types of Cost Finding

In a general way, and from the point of view of cost finding, the various types of manufacturing operations may be divided into three classes, each requiring a particular method of figuring or cost finding. These may be stated as follows:

1. Costs for ordinary manufacturing operations.
2. Costs for operations producing major products and by-products.
3. Costs for operations producing joint products.

It is the character of the operations that makes differences in methods of cost figuring necessary and determines the type of cost finding to be applied to any specific kind of business. It is fundamental that the method of cost figuring should fit the particular operations to which it is applied. In the consideration of any accounting or cost finding method, the first information to be developed is, "What are the operations and transactions to be recorded?" Then the cost computing and accounting procedure must be handled in a method adapted to these particular operations and transactions.

In the packing industry are found many and various operations. All three types of operations mentioned above are represented in the various branches of the business. Therefore, in the cost finding and accounting for that industry each of these various types of costs is utilized. To each kind of operations or transactions is applied the most appropriate cost computation and accounting method.

Costs for Manufacturing Operations

Ordinary manufacturing operations, as found in the great majority of industrial enterprises, consist of the putting

together or building up of materials, labor, and expenses into a finished product. This is the most common type of manufacturing operations, and is generally thought of when cost figuring is mentioned. The steps in such cost finding would be as follows:

1. A known amount of material of a determinable cost is used.
2. A definite amount of labor of ascertainable cost is expended.
3. An average amount of overhead expense is absorbed.
4. The whole is the cost of the finished product.

This represents the steps in cost figuring for the ordinary type of manufacturing operations and is commonly known as "cost finding."

This method of cost figuring is applicable to all businesses having ordinary manufacturing processes, such as the manufacture of automobiles, the manufacture of soap, the manufacture of foundry products, the manufacture of furniture, etc., and, in fact, the manufacture of anything, the operations of which are the putting together and building up materials, labor, and expenses, into a finished product. A varied and somewhat different type of operations are those which involve the taking apart or breaking down of some materials of known value into several or many parts, of which one is the major product and the others by-products. All of these products being derived from the same material are in the nature of joint products, that is, all produced out of something of known cost by the same operations. It is impossible to determine the cost of each product separately, although the cost of all may be figured.

Major and By-Product Costs

The cost of the major product from such operations is usually computed in the following manner:

1. Starting with the known cost of the materials used;
2. Add the costs and expenses incurred;
3. Making the total outlay;
4. Deduct therefrom the value of the by-products produced;
5. The balance is the cost of the major or prime product.

It should be noted that by this method of figuring, the cost of the prime product is arrived at by deducting from or crediting to the total outlay the full value of the by-products produced. The costs of such by-products are not ascertainable and the cost for the major product would not be ascertainable except by deducting from the total outlay the full value of all of the by-products produced.

The problem of costs for major products and by-products is found in several industries, including such as the petroleum oil industry, the production of many farm products, the production of gas, coke, etc., by gas plants, and the cattle business in the packing industry. This method of cost figuring was recognized by the United States Tariff Commission in figuring the cost of wool, mutton being the by-product, and also in figuring the cost of mutton, wool being the by-product. It is essential in figuring the cost of major products that the full value of by-products be credited. By "full value" of by-products is meant the marketable value of such by-products in their first commercial stage, less any costs and expenses to be incurred in processing them to such stage, and in marketing them. This gives the full value of the by-products in their present form at the time of production, and is the valuation to be used in cost figuring. If an arbitrary or different valuation were used, the cost of the major product would not be determined correctly.

By this method of figuring the results of the entire operations—the profit or loss—appear upon the disposition of the major product. The by-products, having been figured at their full value, should not show either profit or loss when disposed of, except as market conditions change or costs of processing

and marketing have been over or under estimated. This is the only known method of figuring costs when major products and by-products are produced out of the same operations, and is customarily applied to such businesses.

Joint Products

The third type of operations are those which are the taking apart or disintegration of something of known cost into several or many parts, none of which may be termed "major" products. They are simply joint products, that is, many products resulting from the same operations performed on a material of known cost. Being joint products it is impossible to figure the cost of each separately, though the cost of the whole group might be readily computed. For such operations it is almost always impracticable to apply an average cost to all of the various products, for the reason that usually some are high grade and of relatively high value, while others are of medium or lower grades with relatively lower values, and an average cost would, therefore, be entirely misleading.

Cost Finding for Joint Products

The practice in cost finding for such operations producing joint products is, therefore, about as follows:

1. Figure the value of all of the products derived from the given operations.
2. Figure the cost of materials going into such operations.
3. Figure the amount of expenses incurred.
4. The total of the materials and expenses makes the total outlay.
5. Compare the total cost expended to the total value of all products derived, arriving at the margin of profit or loss between the total costs and total value of products made.

This method of figuring costs emphasizes three points, namely:

The total cost or outlay.
The total value of the products made.
The margin of profit or loss on such operations.

In some cases the values of these various products may then be adjusted by spreading the profit or loss shown on the entire production, that is, the value of each of the products may be reduced by a portion of the profit or increased by a portion of the loss, so that the total value of the products as a group is adjusted to the total of the outlay. The effect of this procedure is simply to spread the total cost over the various products made, on the basis of the relative market values of the various products. In other businesses this adjustment of spreading the profit or loss over the products is not made, especially if such products are merchantable commodities and may be marketed in their present stage or passed on to other departments of the business for further manufacturing, in which processes their identity is entirely lost. The reason for this will be made clearer later.

Problem of Joint Costs

The problem of joint costs exists in several industries, e.g.:

The Sorting and Grading of Tobacco. Several grades of different values are sorted out of a given amount of tobacco purchased at a certain price. The costs of the various grades sorted out are figured by spreading the total outlay over the various grades on the basis of the relative market values of such quantities of each grade.

The Glue Business. Various grades of glue are produced out of the same operations. The total cost of the processing is spread over these different grades made, on the basis of the relative market values of such quantities of each grade produced.

The Cottonseed Oil Industry. In the cottonseed oil industry, oil meal, hulls, linter, etc., are produced by the crushing of cottonseed. Each product being a merchantable com-

modity in the form produced, the practice in this industry is to compare the cost of seed crushed to the total value of the products produced, arriving at the gross margin realized on such operations. The net results are then determined by deducting the expenses from this gross margin.

The Hog Business of the Packing Industry. An example of this will be shown later.

Need Special Analysis

These are not costs as ordinarily thought of. In fact, the usual methods of cost figuring cannot be applied to operations like these producing joint products. The cost figuring and accounting has to follow and fit the operations. The differences between ordinary costs and costs of joint products may be illustrated by the building up of an automobile and the taking apart of a second-hand automobile. In the building up of an automobile, costs may be figured in the customary manner. Known quantities of materials, parts, labor, and overhead are expended, and the totals thereof make the total cost of the finished automobile. On the other hand, assume the purchase of a second-hand automobile for a certain sum, and proceed to dismantle it. The problem of joint costs would be like attempting to determine the cost of the engine or any part of it, or the cost of a fender, or a tire, or any other part from an automobile, when the only facts known are, first, the total cost of the machine as bought, and, second, the expenses incurred in dismantling. Obviously the costs of any of these parts cannot be determined. The cost of all of them as a group may be figured, but not the cost of any one item. It is a matter of joint products.

We are all quite familiar with the cost figuring procedure for ordinary manufacturing operations, and little time need be spent in elaborating on that. It is simply a putting together of materials of known costs, a determinable amount of labor,

and an average amount of expense, into a finished product. This method of cost figuring is used in the packing industry wherever it is appropriate. It is applicable to such operations as the

Manufacture of sausage
Manufacture of soap
Manufacture of oleomargarine
Manufacture of boxes
Manufacture of cooperage
Manufacture of commercial fertilizer
Manufacture of canned meats, etc.

Cost Figuring for Cattle

The cattle business in the packing industry is a good example of that class of manufacturing operations producing major products and by-products. Dressed beef is the major product from this operation. By-products include hides, oleo oil, stearin, tallow, tongue, other edible small products, bones, horns, hoofs, tankage, fertilizer. The dressed carcass of beef is the largest single product made from cattle by these operations and represents about 50 to 60 per cent of the live weight. This is the prime product produced in the slaughtering and packing operations in the cattle business.

Beef is customarily marketed at wholesale in the form of dressed carcasses, either as quarters or sides, or whole carcasses. When the beef carcass is received by the retailer, it is cut up into various parts, such as roasts, steaks, etc. The retailer faces a problem in joint costs. He knows what the whole carcass costs him, knows what the various cuts that he makes from it are worth. He knows that the market value of these different cuts varies widely, and he is, therefore, unable to apply or spread the total cost over them on any average basis. These retail cuts are simply joint products for which individual costs cannot be computed.

Representative Results

Since the beef is customarily marketed in the form of dressed carcasses by packinghouses, it is the one major product resulting from the cattle operations. Table I is an example of cost figuring for a representative lot of cattle.

TABLE I

EXAMPLE OF COST FIGURING FOR LOT OF CATTLE

1. Live cost 46 head, weight 52,390 lbs. (avg. 1,138), native steers, at $7	$3,667.30
2. Expenses, killing, dressing, chilling (estimated for month)	118.03
3. Allowance—Condemnations, trimmings, etc. (average)	17.77
Total outlay on lot	$3,803.10
4. Less credit for hides (cured values less expenses curing and marketing)	387.06
5. Less credit for fats (value of products less expenses)	116.30
6. Less credit for other by-products (value of products less expenses preparing)	125.73
Total by-products credits	$ 629.09
7. Balance—Plant cost of carcasses, in cooler	$3,174.01
8. Dressed carcasses weighted 29,615—yield 56.53% of beef	
9. Average dressed cost per cwt	$ 10.72
10. Add selling costs and expenses	1.87
11. Total cost of lot, per cwt	12.99

Live Cattle and Beef Spread

It will be noted that this example emphasizes clearly the effect of the yield of beef on prices, creating the spread between the live price and the cost of the beef produced. The total live weight was 52,390 pounds and the weight of the dressed beef only 29,615 pounds. This is a yield of 56.53 per cent of beef out of the live weight. The live cost was $7 per hundredweight, which means $7 for each 100 pounds of live weight. Considering that the yield of beef is only 56.53 per cent, this would have the effect of almost doubling price as applied to the dressed beef produced. This is the most important single factor in accounting for the spread between the

cost of live cattle and the cost of dressed beef, and is probably one of the most confusing factors in the mind of the average consumer. Note also that the value of the by-products is considerably in excess of all the expense, so that the dressed beef might be sold at a good margin over cost and still for less money than was paid out for the live animal.

The credit for hides is arrived at in the following manner: From the current market price for this particular grade of cured hides is deducted sufficient to allow for the shrinkage and expenses in curing and marketing. This gives the present value of the green hides per hundredweight. This price is applied to the actual weight of hides produced by each lot. The credit for raw fats is likewise figured backwards. Starting with the market value of the yield of oil and stearin from fats, the expenses of rendering and marketing are deducted and an allowance is made for the yield of such oils and stearin. This gives the basis for valuing the fats produced from each lot in their present raw state with a fair degree of accuracy. The credit for other by-products, which includes everything else produced out of the animal, is all computed in the same manner. That is, from the values of the finished products at current markets are deducted the expenses of preparing and marketing, which gives the present value of such by-products in their raw state.

Determining By-Product Values

The values of by-products should be determined on the basis of current market prices, for that is the only known foundation. It is impossible to predict what the market for these by-products may be 30, 60, or 90 days hence, when they are disposed of, and to use other than the present market in figuring their values would be merely guess-work. When the current market price is used, any loss or gain realized upon the ultimate disposition of the by-products will be made up of two factors: (1) loss or gain due to changes in market values

of by-products between date of slaughter and date of sale; (2) loss or gain due to adjustments in expenses and yields. As the by-products are figured at their full value, based upon the present market, it follows that the results of these transactions will show as a profit or loss in the disposition of the beef.

These results shown on the disposition of the beef, being the profit or loss between the cost as figured and the price sold for, are subject to periodical adjustment as follows: (1) loss or gain on realization of by-products; (2) difference in expenses between estimated and actual. Applying these adjustments gives the final results, profit or loss, on the cattle business as a whole. Since cattle are customarily bought in the central livestock markets in lots ranging from one or a few head to several carloads, it is usual that the lot as bought is the basis for cost figuring. In some cases purchases of small numbers may be combined into one lot for slaughtering and cost figuring purposes, especially if they are of the same kind and grade.

Almost all of the beef products are sold fresh and have to be marketed within a very limited time after slaughter. The markets for beef and for beef products are changing from day to day. It is necessary, therefore, that the costs of these lots killed daily should be figured within a very few hours after the operations take place. This necessitates estimating expenses and yields of various products on the basis of averages. Hence the results in the beef business within a period, for a day or a week, may be subject to some minor adjustments, but when the business for a period is considered and the adjustments for expenses and by-product values are applied, these become the final figures for the cattle business. Dressed beef is customarily inventoried at cost, for costs are figured and are available. By-products, however, are customarily inventoried on the basis of market values, for no other values are or can be determined.

Joint Products in Hog Business

The hog business in the packing industry is a good example of operations producing joint products. Pork products are customarily marketed in the form of cuts, loins, hams, bellies, shoulders, etc. Very little pork is marketed in the form of a dressed carcass, as is the case of dressed beef. Another feature of importance to be noted is that part of these pork products may be marketed fresh, as is usually the case with loins, butts, etc., and other parts will be cured and smoked and finally marketed in the form of bacon, smoked hams, etc. The hog business differs from the cattle business essentially in that there is no one major or prime product. It is purely a case of joint products, or many products made by the same operations, out of certain raw materials of a known cost.

Table II shows an example of how a test on a lot of hogs would be figured. It should be noted that it follows quite well the procedure already mentioned. The yield column shows the pounds of each kind of product produced out of each 100 pounds of live weight on the average for the lot. Applying the current price to this amount of product, as extended, gives the value of each product out of 100 pounds of live weight. For example: This lot produced, on the average, 13½ pounds of fresh hams for each 100 pounds of live weight. These hams were worth 13 cents per pound. Hence the hams produced were worth $1.76 per 100 pounds of live weight. So with each other product. The complete test is given in the table on page 422.

This is the method used in figuring a test on a lot of hogs and provides the information needed by the management in following the markets, and judging whether or not it is profitable to buy at prevailing prices. It should be noted that it emphasizes the following points: (1) what all of the products are worth at the present market reduced to a live weight basis; (2) the expenses of operation; (3) the cost or present market value of live hogs.

TABLE II

TEST ON LOT OF HOGS

Lot of Hogs of Average Live Weight of 250 Pounds

Product	Weight (lbs.)	% Yield Out of Live Weight	Current Market Price (cents)	Extension
Fresh hams	16–18	13½	13	$1.76
Fresh shoulders	12–15	10	10½	1.05
Fresh bellies	14–16	12	11¼	1.35
Fat backs	8–10	7	7	.49
Pork loins	8–10	10	14½	1.45
Spare ribs	....	1	11	.11
Prime steam lard	....	14½	8	1.15
Trimmings	....	2	7½	.15
Miscellaneous	....	3	4	.12
Yield and gross value	....	73	....	$7.64
Expenses (per cwt., alive)				.62
Hogs per cwt.				$7.02
Hogs cost				6.70
Profit per cwt., alive				$ .32

Department Credits and Debits

Obviously the difference between the value of the products and the total costs would represent the profit or loss between the markets at these figures. This is the method that a man doing a hog business would use in figuring whether or not his purchases were profitable, and in judging whether or not it would be advisable to extend operations. These figures also indicate the basis upon which the fresh pork or killing and cutting department is usually established in most packing-houses. Such a department would draw together the following figures:

As charges to the department:

The cost of the hogs purchased.

All expenses incurred.

As credits to the department:

Value of all products sold or transferred from it.

These factors, together with the inventories at the beginning and end of the period, make up the fresh pork or killing and dressing departmental accounts, indicating the profit or loss for a period on current hog business operations. This statement emphasizes as well that there is no one major product in the hog business. It should be noted further that no one item produced is as much as 15 per cent of the total live weight of the hog. Another point of importance is the wide range in the value of the products realized, from the highest, pork loins at 14½ cents per pound, to trimmings, at 7½ cents per pound. Inventories of such hog products are necessarily valued on a market basis. There are no actual costs for the various products. As these products move throughout the various processes and manufacturing operations, the identity of specific items is lost, so that the only available basis for valuing inventories is the current market for such products.

Departmentization a Feature

Departmentization of the business and of the accounts is one of the features of the present-day packing organizations. Departmentization is necessary because of the large variety of operations and activities which any sizable modern plant conducts. Any plant may have a variety of operations peculiar to itself, and will naturally have to be departmentized on a plan particularly adapted to its physical layout and operations. Some plants handle only a cattle, calf, and sheep business. Others may handle only a hog business. Some will handle all classes of livestock. Some plants do not process by-products to any extent, but dispose of them raw or in the lesser stages of manufacture, while others process their by-products to various degrees. Some plants do not engage in allied industries, while other organizations may have allied businesses, such as glue, soap, fertilizer, etc. The handling of the business and accounting, therefore, requires careful and logical depart-

mentization, appropriate to the particular plant and its activities.

Cattle Departmentization

In the cattle business the departmentization should fit the operations and support the cost figuring and accounting procedure. Figure 24 (a) indicates briefly a general plan for departmentization of the cattle business. This will of course be varied somewhat to meet local conditions, but the general

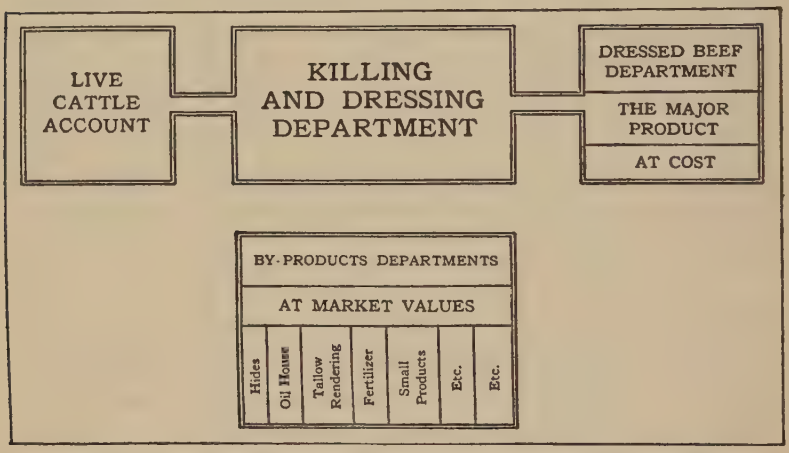


Figure 24. (a) Chart Showing Departmentization of Cattle Business

plan will usually be found about the same in various establishments.

The departmentization of the hog business will naturally be somewhat different because the operations and processes differ materially. One of the outstanding features of the hog business is that the operations are a succession of processes. The dressed carcasses are customarily divided in the form of cuts—hams, shoulders, loins, bellies, etc. Some of these may be sold fresh, some may be put into cure, some may be carried in storage from a period of surplus production to a period of scarcity. As the product comes from cure, some of it may be

sold in that stage, and some of it processed further, into the form of smoked hams, bacon, etc. Each one of these various processes:

Killing, dressing and cutting
Storage
Curing
Smoking, etc.

is in fact a distinct competitive industrial business, and the departmentization has to recognize these peculiar features.

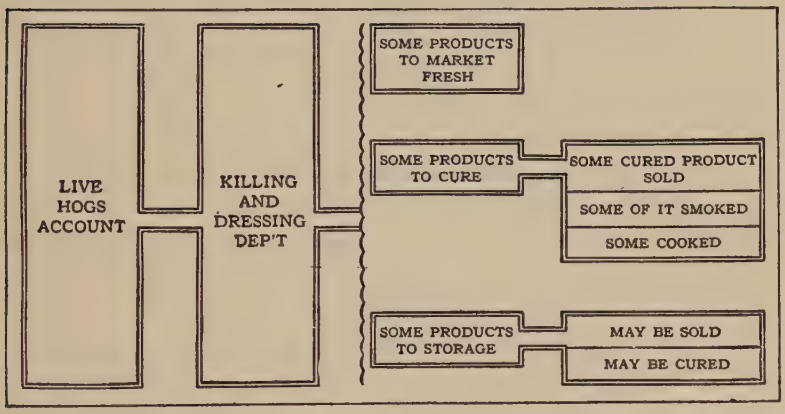


Figure 24. (b) Chart Showing Departmentization of Hog Business

For the hog business, the departmentization will be something along the lines indicated in Figure 24 (b).

Proper Handling of Departments

The present-day packing organization is essentially a group or aggregation of separate industrial activities or competitive businesses. Each department or activity meets the competition of other firms engaged in that particular line of business. There are those which only have a slaughtering business, selling all products fresh. They meet the competition of all slaughterers, including as well local and farm slaughterers. Some

organizations process by-products into further manufactured stages, and in these activities meet the competition of concerns handling packinghouse products, such as rendering concerns, hide dealers, etc. Some concerns cure and smoke pork products, and in this operation meet the competition of firms who do only this class of business. Some plants make sausage and must meet the competition of all sausage makers, whether they do a slaughtering and curing business or not. So the larger organizations, engaging in many of these operations and processes, meet competition of other firms at each of these various stages of manufacturing or processing.

It is necessary, therefore, that each of these separate competitive businesses within the organization be handled, operated, and accounted for, on an independent commercial basis, the same as its competitor is operated and accounted for. That is the only way these larger groups of businesses can be handled or operated. That is the way the organization is built up and the way the business is manned and operated. It is simply an aggregation of separate competitive businesses. This condition means accounting for each department on a commercial basis, charging it for its goods bought at their full value, whether bought from another part of the organization or from the outside; charging it all its factory and general expenses incurred, and selling its product at the full market value, whether it be to the outside or to some other part of the organization for further manufacture.

Meaning of Opportunity Costs

The delivery and receipt of these interorganization sales or transfers at their full value is known as transfers at "opportunity costs." "Opportunity costs" are well recognized in economics, but little considered among accountants. These costs mean simply that any product is worth to a department of an organization what the preceding department had the opportunity to get for it if placed in the outside market

In this industry, at the close of each process or manufacturing operation, the management has the opportunity or option of either selling the product on the market in that stage or of transferring it to some other department for further processing and manufacturing, the product to be ultimately sold in some other form. For example, oleo oil is a merchantable commodity and may be sold as such or may be transferred to an oleo factory for use in making oleomargarine. Fresh hams and bellies may be sold on the market as such or transferred to a curing department to be cured. Cured hams and bellies may be sold as such as they are merchantable commodities, or may be transferred to the smokehouse and manufactured into smoked hams and bacon.

So at each stage in the many processes there is the option of selling the product in its then present form or of passing it on for further manufacturing operations, to be finally sold in a more processed form. This is one of the peculiar features of the industry. The product in its various stages of manufacture is almost always a finished merchantable commodity and may be disposed of in that form. "Opportunity cost," therefore, is the cost to a department of products received from some preceding operation and represents the value the preceding department could get for such products if they were placed on the market in that form.

The markets for various products are the factors which determine the disposition of products in any of these stages. If the market for the product at any stage is more than could be realized if it was manufactured into some other product, then it is more profitable to sell it in the first stage. If the markets for further manufactured products indicate that such processing would yield a profit over what would be realized by immediate sale, then it is more profitable to carry the processing operations further. The fluctuation of the markets for all of these various products is the factor that stimulates or contracts the processing operations and adjusts the

supply of each kind of the various products to the demand for such.

Elements in Inventories

Each one of these various departments handled on a commercial basis receives a final accounting and a profit or loss is realized in each one. This is entirely in order, for as each succeeding operation is performed on the product, labor and expenses are encountered—investment in buildings, machinery, equipment, inventories, etc., is used. The additional manufacturing operations incur additional costs, use additional investments, and should be expected to yield a price sufficient not only to cover the expenses, but to yield a return on the investment used.

The results of the hog business in total are composed of the results of each one of these various departments or processes taken together. For operating purposes, and the conduct of the business, it is necesssary to know how each department stands on a commercial, competitive basis.

Inventories of these various products in the process of manufacture will naturally include an element of unrealized loss or gain. To eliminate this would be impossible, for the reason that these various products are unidentifiable in any of these manufacturing processes. A vat of hams, for instance, may include hams from several lots of hogs bought at different times and at varying prices. A pile of dry salt cuts in the cellar would naturally include cuts made from many lots of hogs bought at different times and at different prices.

It is impossible to follow the products and identify them as they pass through the various operations. Hence it is impossible to allocate any departmental losses or gains. It should be noted, however, that the margin, profit or loss, in the packinghouse operations average a very small percentage of the total value of the products handled, and that as inventories are taken on the same basis at the beginning and end of

a period, the element of anticipated profits or unrealized loss in inventories is quite negligible.

Market Influence on Accounting

Packinghouse operations are conducted between two very sensitive and constantly fluctuating markets—the livestock market on the one hand, where the live animals are purchased, and the product market on the other hand, where beef, pork, and other products are sold. Each of these markets is constantly fluctuating, changing daily or almost hourly, in response to conditions within itself. The general movements of these markets, of course, have to be relative, for livestock is worth what its products will bring in the product market less a margin for the services of manufacturing and distributing. Any individual market, however, is subject primarily to the conditions of supply and demand within itself, for the reason that these are perishable products and have to move into consumptive channels at whatever price will induce the trade to absorb the supply at any time.

Beef, for instance, is not sold in any market for a fixed or figured list price, but for what that product will bring in the market in which it is offered for sale. Retail dealers come to the wholesale houses and inspect the beef offered for sale and make bids. They customarily shop around and take advantage of the best bargains offered. Each individual sale to a retailer is a trade in itself, resulting from bids and askings. This product being perishable, it must be sold within a few hours after it is received at a packinghouse wholesale branch. Necessarily, therefore, it moves at the best prices obtainable under the local conditions of supply and demand.

Live cattle, on the other hand, are customarily marketed by farmers in the established open livestock markets. They are consigned to and offered for sale to packinghouse buyers by commission merchants who act as agents for the producers. The prices for live animals are affected by the prices at which

products are selling and the demand for them, and the quantity of cattle offered on the market.

Fewer cattle coming to market means less beef to be placed on the product market. Less beef at any time in a product market to supply the demand there, tends to raise the selling prices. More cattle coming to the livestock markets means more beef on the product market. A large supply of beef on the product market with steady demand can only be moved at lower prices. And it must be moved. So it is the fluctuation in prices for products and animals that stimulates or contracts the amounts coming to such markets. The trends of prices in the product markets reflect back to the livestock market. Price changes in the livestock market stimulate or hold back shipments by farmers. Naturally they attempt to place their stock on the most advantageous market. When prices are good, shipments coming in are stimulated. When a surplus appears and prices are depressed, shipments are naturally held back.

Costs Do Not Settle Selling Price

Fluctuation in prices determined in open competitive markets is the only agency which adjusts the production of goods to the demand for them. It is the desires of the consuming public, and the prices they are willing to pay for goods and service, that lead to the expenditure of human effort necessary to produce such goods. The forces controlling prices in markets between which the packing industry is conducted do not differ fundamentally from the forces controlling markets for any competitive industry. The significant feature is the sensitiveness of these markets for livestock and packinghouse products, which is due to the perishable character of the products, that necessitates prompt movement into channels of consumption. In this connection special reference should be made to an article appearing in the *Journal of Political Economy,* Volume XXIX, No. 8, October, 1921, entitled

"Unit Costs as a Guiding Factor in Buying Operations," by George E. Putnam. This article emphasizes in a very clear and able manner the fact that unit costs do not determine selling prices. It is the demand for goods that leads to the supply, and the present and prospective consumers' prices that lead to producers' prices.

The fact that the markets for livestock and packinghouse products are unusually sensitive means that those controlling such packinghouse operations must be promptly and well supplied with market information and cost statistics. They must have at hand at all times the most recent information as to the markets and costs of live animals; they must know what the products are selling for, wherever such products are marketed; and must have up-to-the-moment and reliable information as to costs. These conditions impose on the accounting forces of packinghouse organizations more exacting requirements than are commonly met in other industries. In addition, there are the peculiar cost and accounting problems arising out of the character of the operations which have to be considered. Summing up the whole matter, the packing industry probably places greater responsibility on its accounting and statistical forces than most industries, and the information and statistics prepared must be dependable and supplied promptly. Old cost figures and statistics may afford consolation but they do little good for the current business.

CHAPTER XIX

EXTENSION OF LIVESTOCK PRODUCTION—1880–1922[1]

Cattle Center in West

In 1880, 78 per cent of the population of the United States was east, and more than half (56 per cent) of the cattle west of the Mississippi River. Today, while more than two-thirds of the population is in the states east of the Mississippi, more than two-thirds of the cattle are west of the Mississippi. In comparing the manufacturing and non-manufacturing sections of the United States in 1910, it was seen that more than one-half of the population was found in less than one-seventh of the country, namely, the states east of the Mississippi and north of the Ohio and Potomac rivers. This portion of the United States produces more than three-quarters of the manufactured products, pays more than three-fifths of all salaries and wages, and contains more than two-thirds of the assessed value of all real and personal property. It is, therefore, the great consuming area. Yet in the region east of Chicago there is less than one-eighth of the beef cattle and less than one-fifth of all the cattle in the country.[2]

It is not possible to locate the center of beef production in 1840, since the census of that date failed to distinguish between "milk" and "other" cattle, but in 1850 the center of beef cattle production was located in the approximate vicinity of Richmond, Kentucky, to the south of Lexington. Its location there makes it probable that the center of beef production

[1] In this place it is not possible or necessary to treat of the technical phases of livestock production.

[2] Mumford, H. W., and Hall, Louis D. "Beef Production in the United States," *The National Provisioner* (Jan. 17, 1914), Vol. L, No. 3

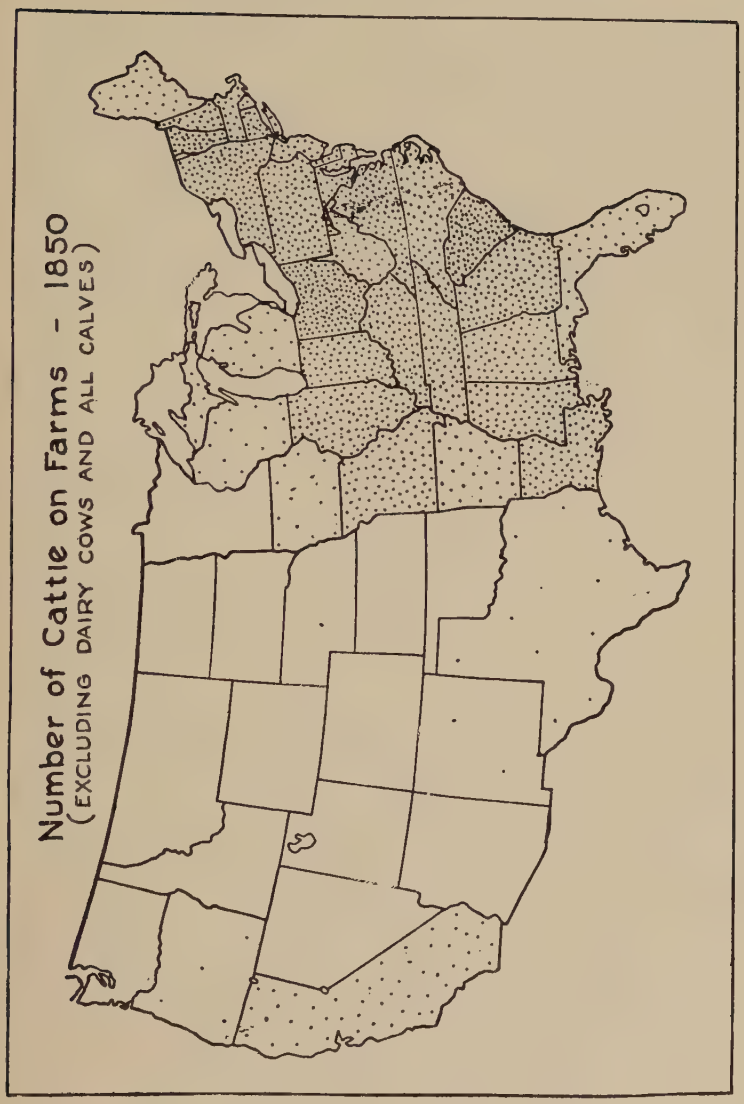


Figure 25. (a) Map Showing Number of Cattle on Farms, 1850

in 1840 was not far from the center of hog production at that time, although it may have been somewhat to the east, over the line in West Virginia.[3]

By 1860 a great change had taken place. The center had moved some 250 miles westward to Lowes, Kentucky, a short distance to the southwest of Paducah. The rate of movement was directly due to the rapid settlement of the West, while the direction of movement depended on the great increase in "other cattle" in the state of Texas from 112,000 to approximately 3,000,000 head.

Civil War Effects

The Civil War altered the direction of displacement for the center of beef cattle production by about the same degree to the northwest that it had deviated to the southwest during the previous decade. The confederate states, exclusive of Texas, lost approximately 1,500,000 head, while the Corn Belt and Northwest showed the impressive gain of about 2,000,000 head. The center was in the vicinity of Bixby, Missouri, some 60 miles southeast of Rolla.

By 1880 the center had reached Vienna, Missouri, about 35 miles southeast of Jefferson City. This relatively small displacement was due in part to the recovery of the South, which tended to retard any northward or westward movement, and in part to the lowered rate of increase in the Northwest and Corn Belt. In 1890 the center was at Creighton, about 60 miles southeast of Kansas City, Missouri. The displacement was almost due west during this decade, as a result of the balanced increase in cattle production in both the northwest and southwest range, and the decreased production of beef cattle further east.

The 1900 census saw a westward move, the center being located a few miles northeast of Waverly, Kansas, and about

[3] This is based on a very interesting monthly letter to animal husbandmen, by E. N. Wentworth, Director, Armour's Livestock Bureau, November, 1921.

30 miles to the southwest of Ottawa. A slight southerly deviation thus occurred from the almost due west line followed in the previous decade, due to the relatively better conditions in the southwest range as compared to the northwest range, and also to the further recovery of the Southeast.

The displacement between 1900 and 1910 was relatively slight, being no greater than that which occurred between 1870 and 1880. The direction was almost due northwest, and the location was in the vicinity of Eskridge, about 40 miles southwest of Topeka. This northward shift was dependent on the great decrease in Texas and Oklahoma, some 4,000,000 head being lost in these two states alone. By 1920 the center of production had passed to the west of the geographic center of the country and was in the vicinity of Ellsworth, Kansas. Part of this westward shift was dependent on the unparalleled decreases in all of the New England, Middle Atlantic, South Atlantic, and eastern Corn Belt states.

Cattle Increase by Decades

The number of cattle increased rapidly during each decade to 1900. Since the beginning of this century a relative decline has set in, for although the cattle of the United States have increased numerically by decades up to the present, their number has not kept up with the increase in population during the last 30 years. In 1890, the number of cattle equalled 80 per cent of the population, but in 1910 it was at most no higher than 75 per cent, while the population had grown 21 per cent. There was a decided increase in cattle in many states from 1870 to 1890. This was the period of the range, and the cattle "kings" and "barons" were at the height of their prosperity. During the next decade further increases were noted in Texas, Oklahoma, Colorado, and the Dakotas, while the remaining range states showed a decrease or remained practically unchanged.

The most notable feature of the decade 1880–1890 was

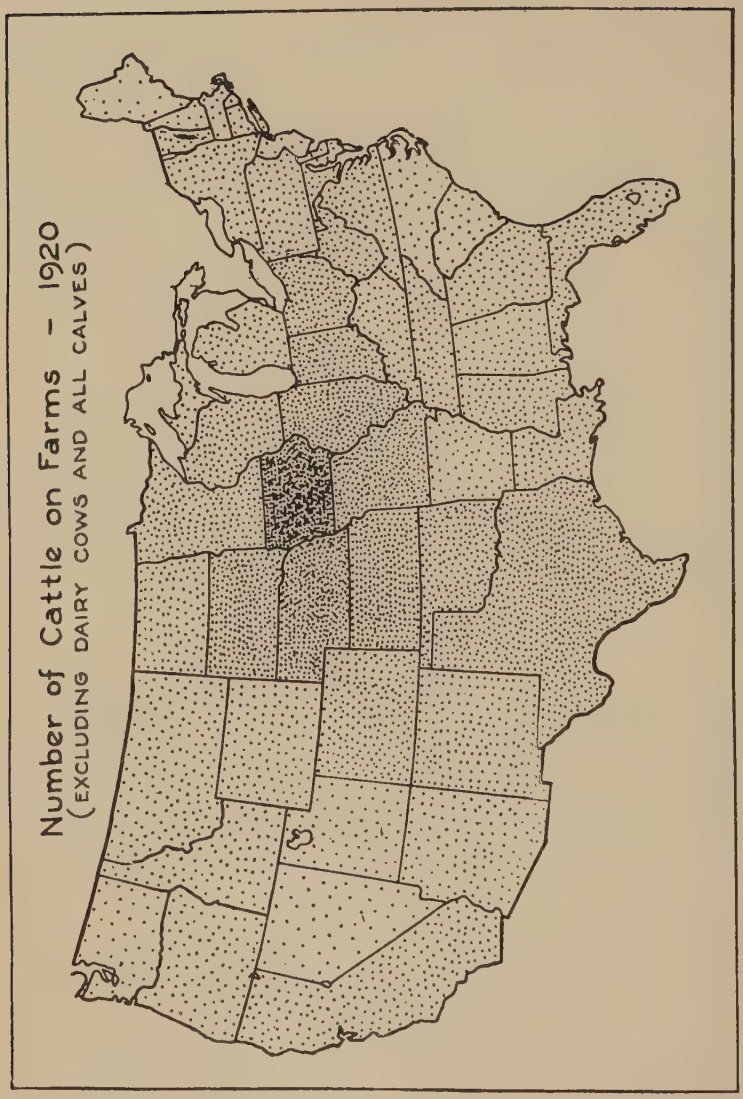


Figure 25 (b) Map Showing Number of Cattle on Farms, 1920

the improvement of livestock through importation. The Aberdeen or Polled Angus, introduced about 1870, showed themselves adapted to the climate and conditions of the north central states. There was in this period a generous rivalry between herdsmen regarding the superiority of Shorthorns, Herefords, and Polled Angus, all of which breeds were of great value to the United States. They comprise practically all the pure-blooded cattle in the country for breeding and grading up native cattle for beef. From 1900 to 1910 there was a decrease in Texas and smaller declines in New Mexico, Arizona, and Montana, all other western states, especially Wyoming and the Dakotas, showing increases. These decreases, at first in the northern range states and then in the southern, were due in large measure to the passing of the 4-year-old steer.

Recent Trends

During the period since 1907 the following summary indicates the trend:

1. Beginning with the near panic at the close of 1907, there was a tremendous demand for cheap beef.

2. An immense sacrifice of cows and heifers to satisfy the great demand for cheap beef followed, leaving the whole country seriously short of breeding stock.

3. The depletion of the nation's stock of female cattle forced packers and slaughterers to turn to the lighter and cheaper steers to meet the continued heavy demands for cheap beef. This brought them into direct and constant competition with feeder buyers, raised the general level of prices for the latter, and caused a general scarcity of cattle for the feed lots and a consequent higher cost of fat cattle.

4. A series of adverse causes, including financial stringency, disastrous periods of drought, fear of tariff removal consequences, foot and mouth disease, three deficient corn crops in succession, war, two terribly severe winters, three

years of the greatest cattle slaughter ever known, and scarcity and high cost of feed and farm labor, together with general distrust concerning future cattle values, combined to prevent recovery from the general shortage of either breeding stock or young cattle suitable for the feed lots. This was especially true with the population growing at the usual rate, with labor fully employed at very high wages and disposed to purchase liberally of beef whenever retail prices were brought within reasonable distance of the prices paid for live cattle.[4]

New Cattle Sources

New sources of supply, however, are being developed and the cattle production on old ranges is being increased. It is generally conceded that the carrying capacity of the remaining areas of public range is at least 25 per cent less than it was originally, the result of grazing stock at improper seasons and of overstocking. It is also a fact that the productiveness of many privately owned ranges, both fenced and unfenced, has been reduced through faulty management.

The United States Forest Service is at work on a system of range management and improvement for large grazing units, which will build up the depleted areas and insure the maintenance of the whole range in good condition. The problem is: (1) finding the system of management that will best bring about natural reseeding of the existing forage plants; (2) finding new plants suitable for seeding on the ranges of the southwest; (3) determining the number and distribution of stock watering places necessary for efficient use of the range, taking into account the cost of construction and returns expected; and (4) determining the carrying capacity of the range as a means of preventing its being overstocked.[5]

[4] "Present and Future Cattle Supply," by M. F. Horine, Statistician, Union Stock Yards and Transit Company, Chicago. Mr. Horine says: "I cannot accept the cattle estimates of the Department of Agriculture according to which there were 11,000,000 head or 20% more cattle in the United States on January 1, 1919, than at the corresponding time in 1914. These figures are open to serious question and do not purport to be more than an estimate."

[5] U. S. Department of Agriculture Bulletin No. 588, "Increased Cattle Production in Southwestern Ranges," by James T. Jardine, Inspector of Grazing, and L. C. Hurtt, Grazing Examiner (Nov. 15, 1917).

The cattle feeding business has changed greatly during recent years.[6] Formerly, steers from 4 to 6 years of age were fed in large numbers upon commercial foods at yards near granaries or mills, or on large farms where only the roughage was grown, and the cattle were kept on full feed for six months or longer. This method became too expensive, so feeding is now conducted upon farms as a means of marketing farm products by converting them into beef, while the manure produced is utilized as a by-product for maintaining fertility. At the present time in the corn belt cattle are usually fed in small herds of one to four carloads, and are marketed at 18 months to 3 years of age.

Several factors have united in causing these changes; for instance, a gradual increase in the value of farm products and the cost of farming and feeding operations, and the rapid increase in tenant farming in many cattle feeding sections. These tend to discourage cattle feeding.

Feeder Cattle Sources

There have been two main sources of supply for feeder cattle—those grown in the corn belt, commonly called "natives," and those coming from the western ranges. The native cattle were usually grown on the rougher farms of the Corn Belt, or on the small farms, where dual purpose cows were kept. They were usually sold to local feeders as yearlings or 2-year-olds. Some feeders desiring animals of extra good quality raised their own feeders. A new source, however, is now being developed in the South. Growing good beef cattle is a new industry in the South, but one that has developed so rapidly in the last few years that it is now among the leading phases of southern agriculture.[7] Fifteen years ago, when

[6] U. S. Department of Agriculture Bulletin No. 588, "Economical Cattle Feeding in the Corn Belt," by J. S. Cotton and W. F. Ward (June 24, 1914). See also U. S. Department of Agriculture Report No. 111 (1916), "Meat Situation in the United States," Pt. III, "Methods and Cost of Growing Beef Cattle in the Corn Belt States," by J. S. Cotton, Moulton O. Cooper, W. F. Ward, and S. H. Ray.

[7] Growth of the Beef-Cattle Industry in the South, Yearbook, Department of Agriculture, 1917, p. 749.

cotton was the principal crop, very little attention was given to the improvement of beef-cattle herds, although the actual number of these cattle was greater than at present.

There was a gradual decrease in all beef animals in the cotton belt from 1900 to 1914, after which there was a gradual increase to 1917. However, greater improvement has been made in quality than in numbers. When cotton reigned supreme, farmers kept their steers until they were 5, 6, and even 8 years old before marketing them. This practice gradually changed as interest in beef-cattle raising became more intense, farmers selling their cattle at an earlier age from year to year until now very few are kept beyond three years. At the same time more attention has been given to marketing, and as a result a minimum number of cattle are kept, other than the breeding stock.

The Southern States

The year 1909 really marked the beginning of the beef-cattle business on a practicable basis in the South. Before the Civil War southern slaveholders took a great deal of pride in having a few well-bred cattle of the Devon and Shorthorn breeds on their plantations, and the blood of these cattle is still found in the native southern herds in a few rich-red, big-framed cows.

In the states of Louisiana, Arkansas, Mississippi, Alabama, Florida, Georgia, and South Carolina, especially where cotton was the principal crop, little thought was given to intelligent selection and breeding of beef cattle. The use of scrub bulls was so general and inbreeding so intense that the native mongrel cattle, with very few exceptions, were very inferior, and no improvement was made until the appearance of the cotton boll weevil, which forced the farmers into the cattle business. Then, of necessity, farmers began to look for some new industry that would fit into their farm operations and take up the lost motion.

It was then that the South's mild climate, good carrying capacity of pasture for 8 or 9 months a year, heavy yields of the different legumes, large yield of by-products from cottonseed, and large yield of grain most forcefully suggested cattle raising.

Hogs and Their Spread

Hogs have always been the mainstay of American meat production. In the middle of the eighteenth century, the colonies took advantage of the wars in which the British Empire was involved to wrest from her a share of the West Indian pork and provision trade, and the business thus established has persisted in increasing dimensions until the present day.

America is the great pork consuming nation. In 1900 the per capita consumption of pork and lard was 89.2 pounds; in 1909, 80.4 pounds; in 1916, 90.9 pounds; in 1917, 70.1 pounds; in 1918, 87.3 pounds; in 1919, 83.0 pounds; and in 1920, 83.2 pounds. Our closest rival is Germany, which in the period of 1904–1913 consumed an average of 69 pounds per capita. Great Britain, on the other hand, consumed only 34.5 pounds; France only 27 pounds; and Canada only 55.5 pounds. Possibly a more important measure of the rôle of pork in the diet is the percentage of pork in the total meat consumption. Over a 10-year period previous to the war, 61 per cent of the German meat diet was pork; 45.1 per cent of the Canadian diet; 41.8 per cent of the United States diet; 34.2 per cent of the French diet; and 29.2 per cent of the British diet.

Detailed data on the hog industry were not available until the Sixth Census, in 1840. At that time New York, Ohio, Virginia, Kentucky, and Tennessee were the principal hog states, all of them having in the neighborhood of two million or more. Tennessee was the leading state with 2,926,607 head. The center of hog production was in eastern Kentucky as shown in Figure 2a (page 50). In 1850 the center of

American production had shifted about 100 miles west and a few miles south. This was due to tremendous decreases in the New England and North Atlantic states as far west as Ohio, and the rapid increase in Indiana, Illinois, and Missouri. Tennessee was still the leading state with 3,104,800 head, and the southern displacement was caused by the rise of the Carolinas and especially of Georgia and Alabama.

North Gains and South Loses

The Eighth Census in 1860 was extremely significant. The center of hog production had moved some 80 miles southwest, due to the great increase in Texas and California, and the continued decrease in the manufacturing states of the Northeast. The South had already begun the diminution which in after years was attributed to the war. Tennessee dropped to 2,347,321 hogs in this decade, while Indiana became the premier swine state with 3,099,110 head. Kentucky decreased a half-million and Alabama, Georgia, the Carolinas, and Virginia another half-million total. The Corn Belt made liberal gains in this decade, Missouri and Iowa increasing over 600,000 head, while Indiana gained 800,000, and Illinois nearly 600,000.

The war made possible the almost directly northward displacement of the center of production by 1870. Ohio and Indiana lost a total of 1,700,000 hogs, while Illinois, Michigan, and Wisconsin picked up about 400,000. Iowa equaled the total of these four states, while Minnesota for the first time became a factor in influencing the hog trade. Illinois was the banner hog state during this census, while California and Texas showed decreases. The northeastern states continued to decline, while the southern states east of the Mississippi and south of West Virginia and Kentucky lost about 6,000,000 head. Not all of this was due to the war, as was noted in the previous paragraph. Much of this decline was due to the fact that the southern states were consistently over-

stocked with hogs in relation to the population, and had no means of broadening their outlet for pork products.

Iowa Takes the Lead

The westward shift from 1870 to 1880, and from 1880 to 1890, is directly traceable to the rise of Iowa, Missouri, Nebraska, and Kansas, although the Pacific Coast had begun to pull on the center. Iowa assumed the lead in hogs in 1880 and has never since yielded it. The eastward recession in 1900 was due to the recovery of the southeastern states, as was the southern shift from 1910 to 1920. The westward movement from 1900 to 1910 was a result of the settling of the West and Northwest, the inroads of the farmer into the old range country.

Future moves are uncertain. It would not be surprising to see a displacement eastward again, since many believe the present business disturbance must recover in an easterly to westerly direction. However, much depends on the rate of recovery, on the influence of the future cotton market as affecting the type of southern agriculture, and on the diversification of the West.

Sheep Distribution

In 1910 sheep were fairly evenly distributed throughout the western half of the United States, with concentration points in southwestern Idaho, central Colorado, and throughout Wyoming.[8] In the East they are rather thinly scattered, but there is a decided center in southeastern and central Ohio and in south central Michigan. There is a notably thin distribution of sheep in the tier of states along the 100th meridian from Texas to North Dakota and they are relatively scarce in the cotton belt. In the West the production of sheep is managed in an entirely different way than in the East. In the West sheep are

[8] This is from Federal Trade Commission Report on The Meat Packing Industry, Pt. I, p. 400.

grazed on open ranges for the most part by large owners who specialize in the business. In the East a flock of sheep is frequently found on farms where there is diversified agriculture. Sheep are often used to pasture the rougher and less accessible portions of farms. The notable concentration of sheep production in Ohio is an historical development.

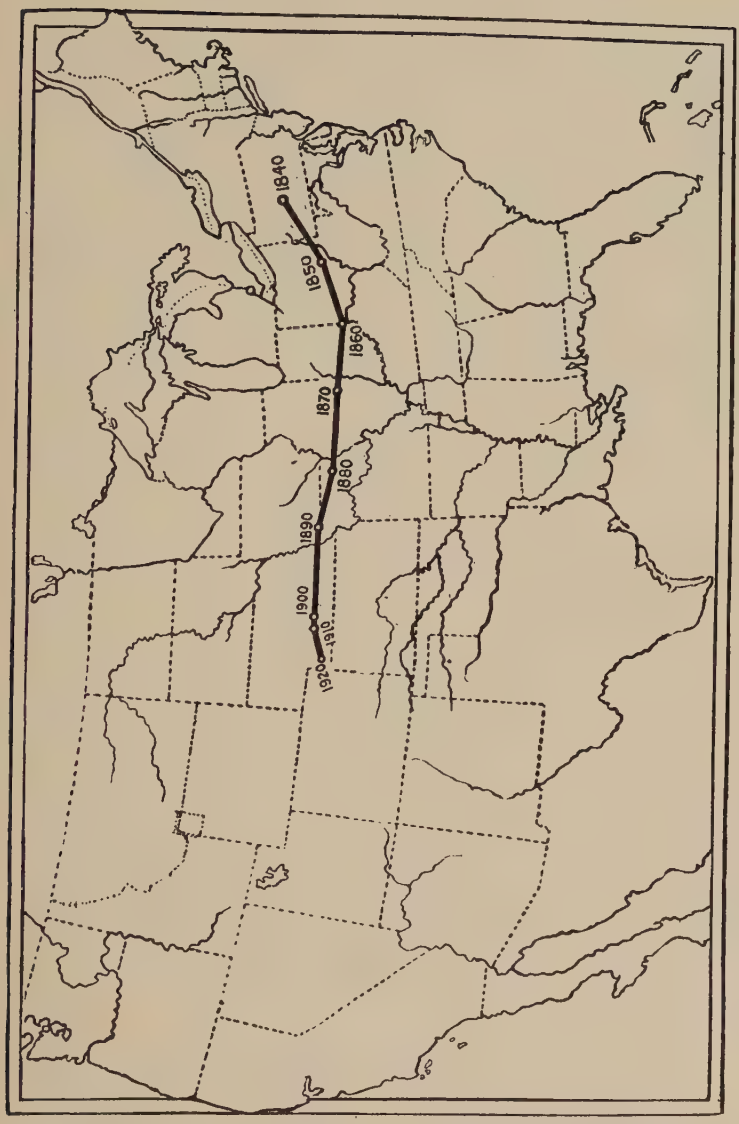
The number of sheep in the United States has been steadily declining, relatively to population. In 1880 it was 42.1 millions, in 1890, 40.8 millions, in 1900, 41.8 millions, in 1910, 57.2 millions, and in 1920, 48.6 millions.[9] This decline is noticeable in the western sections of the country. The general trend of the distribution of sheep, as with cattle and hogs, has been westward.

Trend of Sheep Centers

More noticeably than in the case of swine and beef cattle the displacement of the center of sheep production has been almost directly westward. In 1840 the center was 30 miles north of Altoona, Pennsylvania, and New York was the leading sheep state with over one-fourth of the total number of sheep in the United States. Ohio was second; Pennsylvania, third; and Vermont, fourth.

The year 1850 saw a marked decrease in the total number of sheep in New York and a corresponding increase in the number in Ohio. The center of production moved across the Pennsylvania border to the vicinity of Beverly, Ohio, about 35 miles north of Parkersburg, West Virginia. Ohio assumed the lead as a sheep producing state and did not yield it until the census of 1900. During the next decade the center of production completely crossed the state to the Indiana-Ohio border line. The center was in the vicinity of Harrison, Ohio, about 20 miles to the north of Covington, Kentucky. New York was still the second state in sheep population, but her position was lost early in the following decade to California.

[9] Yearbook of Figures, *Chicago Daily Drovers' Journal* (1920), p. 94.



Courtesy Armour's Livestock Bureau

Figure 26. Map Showing Change in Center of Sheep Production, 1840–1920

In 1870 the center was located about 5 miles south of Westfield, Illinois, and about 50 miles to the southwest of Terre Haute, Indiana. After Ohio, the leading states in sheep production were California, New York, Michigan, Indiana, and Illinois respectively. The census of 1880 placed the center of sheep production near Edina, Missouri, about 50 miles southwest of Keokuk, Iowa. In this census California reached her premier position as a sheep state, having 4,152,349 head to Ohio's 4,902,486 head. Texas for the first time became a determining factor in sheep production and ranked third with 2,411,633 head. Michigan was again fourth, while New Mexico went into fifth position.

Iowa claimed the center of production in 1890, although she herself ranked only nineteenth. The point was located about 5 miles south of Clarinda and about 70 miles north and slightly west of St. Joseph, Missouri. Texas passed California and stood next to Ohio, with Michigan still fourth and a newcomer, Montana, fifth.

In 1900 Ohio was for the first time surpassed as a sheep producing state. Montana ranked first with 6,170,483 head; Wyoming, second with 5,009,613 head; and New Mexico, third, with 4,899,487 head. The center was located in the vicinity of Pleasanton, Nebraska, about 20 miles to the north of Kearney. 1900 was the banner year for sheep production in the United States, as the total was 61,503,713 head, approximately a 70 per cent increase over 1890, which showed 35,737,364 head, the largest production up to that time.

Sheep Decrease Since 1900

Since 1900 the sheep population has decreased. In 1910 it was about 9,000,000 head less, but the decrease was relatively proportionate all over the country, since the displacement of the center was only about 20 miles due west of its 1900 location. In 1910 it was a few miles east of Sumner, Nebraska.

The sheep losses registered by the 1920 census are familiar to many. Approximately two-thirds as many sheep were listed in 1920 as in 1910 and the decrease was much greater to the east of the Mississippi River than to the west. Texas became the leading sheep state, although her total was only 2,552,412 head. California ranked second; Idaho, third; Ohio, fourth; Montana, fifth; and Oregon, sixth. Eastern decreases were very marked, New York showing only a few over a half-million, and approximately one-ninth of the number she possessed in 1840. The center of production moved to the southwest corner of Nebraska in the neighborhood of Imperial.

The decadence of certain states as sheep producers is very marked. Reference has already been made to New York, but other states have shown even more impressive decreases. Vermont in 1920 possessed only one-twenty-sixth of her sheep population of 1840; New Hampshire, one-twenty-second; and Connecticut, one-fortieth. Ohio today shows about three-sevenths of the number of sheep she possessed at her high point in 1870, a decrease of 2,800,000; Michigan shows less than half of her best record in 1900; Wisconsin possesses only a little over a quarter of the 1,675,000 she had in 1900; while the Atlantic Coast states, the Gulf states, and the Bluegrass district are all greatly reduced. The range droughts have been calamitous in Montana, Idaho, Wyoming, New Mexico, Arizona, Utah, and Nevada, the total reduction between 1910 and 1920 being approximately 10,000,000 head. Curiously enough some states have been very constant in their sheep population for the last three censuses, as, for example, Iowa and California, while Kansas has actually registered an increase.

Mutton Consumption and Business

Like beef consumption, mutton consumption is quite intimately related to the financial and business conditions of the country. Pork consumption, on the other hand, is much more stable. During the last 14 years the average pork consumption

was 71.2 pounds per capita, its average annual deviation was 4.01 pounds, and the percentage of the deviation in terms of the average was 5.63 per cent. The corresponding figures for beef were 66.2 pounds per capita consumption; 7.4 pounds, average annual deviation; and 11.17 per cent, annual deviation in terms of the average. Mutton is almost exactly the same, showing an 11.38 per cent deviation in terms of the average, based on an average consumption of 6.5 pounds, and an annual deviation of .74 pounds. Veal is still more variable, since its consumption per capita averages 6.6 pounds, its annual deviation 1.04 pounds, and its per cent deviation in terms of the average, 15.75 per cent.

Great Britain leads all countries in mutton consumption, its average for about 18 years varying from 25 to 27 pounds, as against 55 to 60 pounds of beef and veal combined, and 31 to 38 pounds of pork. Detailed figures are not available on mutton consumption in Australia, New Zealand, and Argentina, but they presumably approach Great Britain, although they do not excel her. Canada consumes about 9 pounds of lamb to 61 pounds of beef and 67 pounds of pork and lard. France consumes about 9 pounds of mutton and lamb to 43 pounds of beef and veal and to 27 pounds of pork. Germany consumes only from 1.9 to 2.5 pounds of mutton and lamb as against 39 to 45 pounds of beef and veal and 65 to 73 pounds of pork and lard. Since the United States consumes about 6.5 pounds of mutton and lamb to 72.8 pounds of beef and veal and 71.2 pounds of pork, it will be seen that she occupies a position below Canada and France, but above Germany in her consumption of mutton and lamb as a part of her meat diet.

What this indicates in the future is difficult to say, as the wool situation in the United States has always overshadowed the mutton situation. Slightly better prospects in both the wool and meat trade from a relative standpoint would suggest a recovery of the drought-stricken areas of the Northwest and

an increase once more in their flocks. This will probably result in a displacement of the center of sheep production toward the northwest.

The last sheep census shows a decline in ten years of 18,000,000, a drop from 52,000,000 to 34,000,000. In the first nine months of 1921, 17 per cent more sheep were slaughtered than during the corresponding period in 1920. Most of the ewe lambs of 1919 and 1920 were killed, and those two crops cannot be replaced. According to John Clay, the veteran stockman, this situation has worked great harm to the country.

Sheep and Wool Slump

For a time the slump in wool and the decline in mutton reduced the value of the ewe below her intrinsic worth. In consequence the loans on many western flocks were greater than their worth. The bankers were not sympathetic to the sheep business. This policy, however, failed to bring the business out of the woods. Different treatment was necessary, careful reinforcing, building up, and handling. It is fortunate that at present every effort is being made, according to well-known authorities, to counteract the errors of the last two years in regard to credit.

The decline of the sheep industry in the West, outside the forcing of lambs to market in 1919 and 1920, came from the contraction of the range. The dry farmer and the small ranchman forced out the cowman first and then the sheepman. Finally about 1910, there was a vast increase of land seekers, and one of two things had to happen—the flocks had to go or land had to be bought. Many liquidated and left, while the sheepman who had invested too largely was in a bad way.

The Future

The change, however, has now begun, and things are running in favor of the sheepman once more. Due to the fall

in wheat values, until it is hard to make a living, the retreat of the dry farmer has set in. The sheepman is able to acquire land cheap for grazing, with the prospect of 50 per cent wool and $8 and $10 lambs. A new era is opening up.

In taking advantage of this situation, however, this advice of a veteran is worth hearing: "Prosperity will come when the flockmaster gets back to the canvas-covered wagon. For his place is near his sheep with the careful looking to accounts and markets, and no straining of credit."

CHAPTER XX

WESTWARD EXTENSION OF MEAT PACKING

Packing Follows Livestock

After consideration of the extension of livestock production in recent decades it is well at this point to trace broadly the spread of the packing industry over the country, a process that made possible the position it now has as the largest industry in value of product in the United States. Following the new supplies of livestock westward and extending with the rise of the dressed beef trade, the packing industry is found beginning operations at St. Louis in 1870, at Kansas City in the seventies, in Omaha, Nebraska, a little later in the same period, and at St. Joseph, Missouri. Thus, while Chicago remained the greatest cattle market and the packing plants there were the largest, there were growing up other great plants at points along an advancing frontier of 1,000 miles north and south. The movement of the packing industry was thus first toward the west while in recent years it has been developing in the South. Attention must now be directed to the progress westward.

By 1877 there were three slaughtering establishments on a large scale at the National Stockyards, East St. Louis, but though St. Louis has continued to be a great center, it was to be outdistanced by Kansas City and Omaha which were nearer the cattle source.[1] This can be seen by the figures of receipts and shipments of livestock, for example in the Yearbook of the *Price Current-Grain Reporter.*

[1] Vest Report (pp. 56–57). Testimony of John M. Osborn, Division Freight Agent of the Wabash Railroad.

Packinghouses were established early at Kansas City by the promise of an abundant supply of hogs and the good railroad facilities for receiving them from the farms and distributing the manufactured product. The pioneer packers in Kansas City also saw a good chance for success in yards at railroad terminals and centers which were at the same time on a competitive freight basis with Chicago and close to producing areas.[2] Their coming furnished a ready market for all receipts and at satisfactory prices, and a new stimulus was given to the hog industry throughout the new West and the territory tributary to Kansas City, which is one of the greatest of hog regions.[3] The building of a livestock market at Kansas City attracted the attention of meat manufacturers and men with means were found to finance packing establishments. While at first attention was given to pork packing the nearness of the range country made the city well adapted to the dressed meat business also. The early packers at this point did good work, but gave way in a few years to others. For the pioneers were possessed of but moderate resources and, competition being keen, they gradually gave place to larger and more powerful concerns.

Early Kansas City Packing

In 1869 Dr. F. B. Nofsinger of Indianapolis joined an earlier packing firm of Pattersons, which later became Nofsinger and Company, and was the first concern to ship fresh beef in refrigerator cars to the East, out of which it developed an important business.[4] A year later the firm of Plankinton and Armour leased the old Nofsinger house and in 1871 built their own establishment. Their business was packing mess beef, putting the product into barrels, and loading it on steam-

[2] The Morris *Standard* (house organ of Morris and Company), article "Developing the Packing Business—the Rise of Kansas City and East St. Louis," quoted in *The National Provisioner* (Apr. 19, 1913), Vol. XLVIII, No. 16.

[3] Powell, Cuthbert, Twenty Years of Kansas City's Livestock Trade and Traders, p. 47; and McCoy, J. G., Sketches of the Cattle Trade, Chap. XV, "Packing at Kansas City, 1874," p. 30.

[4] U. S. Department of Agriculture, First Annual Report Bureau of Animal Industry (1884), pp. 246–248, article by Edw. W. Perry.

boats plying on the nearby river. The first year they packed 14,000 cattle and 30,000 hogs and in 1873 felt justified in building an ice house and chill room, doubling their capacity.[5] In the next decade the pork packing industry of Kansas City increased from 180,357 hogs packed in 1877 to 1,889,054 in 1887, a gain of 891 per cent.

As Kansas City began to attract attention as a packing point new firms were drawn there. Beginning with 1880 the Anglo-American Packing Company erected a plant near the mouth of the Kaw and killed about 350,000 hogs the first year. Swift and Company opened a branch plant in Kansas City in 1887, and in the same year Kingan and Company of Indianapolis and Belfast, Ireland, one of the oldest and wealthiest packing firms in the country, opened a branch at Kansas City. This company gave special attention to English cuts and an extensive business was done with Ireland, the United Kingdom, Germany, and France, and even India and Australia. In 1891 they began to give attention to the killing of cattle as well as hogs, shipping in their own cars their dressed beef to their own branch houses over the South and East.

The success of these houses soon attracted the attention of other packers, including the Kansas City Packing Company, later the Phoenix Packing Company, which finally, in January, 1893, was bought by Schwarzchild and Sulzberger, cattle shippers and beef exporters of New York, who realized that just as the western packers had extended their organizations east, so they must extend their operations into the West to tap the growing central livestock markets. Following the smaller packers who had been establishing themselves, other larger packing companies in the United States which had no plant here, the Cudahys, Nelson Morris and Hammond, had to consider whether they could much longer remain out of the second largest livestock market in the world, and out of trade that can be covered only from Kansas City. By about the

[5] Powell, C., *op. cit.*, p. 89.

beginning of the century Morris and Company and the Cudahy Packing Company did build plants in Kansas City.

Wichita and St. Joseph

By the early years of the twentieth century several packing plants had been established at another Kansas point, namely, Wichita. One of the biggest was the plant of the Jacob Dold Packing Company which at the time it was built (1902) was said to be one of the greatest west of the Mississippi.[6]

As an example of the packing industry's extension westward toward the source of livestock supply, St. Joseph, Missouri, is of importance, though of later development than some others. There had long been local packinghouses there. The first one, founded by David Pinger in 1853, was followed a few years later by Henry Krug and Company, the Missouri Valley Packing Company, Horc and Brother, S. S. Connett and Brother, Fowler Brothers and Smith, Farlow and Company, all of whom were pork packers, for this was before the days of dressed beef.[7] Finally, in December, 1887, the stockyards of St. Joseph were opened. Several small packing concerns, such as Viles and Robbins, the Anchor Packing Company, the St. Joseph Packing Company, and the John Moran Packing Company established themselves in St. Joseph, though most of them had to discontinue business and sold out to others. Among the reasons for this were lack of capital and the fact that St. Joseph was not as yet a big enough livestock center for an extended business. For this had to be developed. Thus in the middle nineties the packing industry was languishing in St. Joseph.[8] Then it was that the plan was worked out for the establishment of an up-to-date stockyards by John Donovan, already general manager of the yards there for G. F. Swift and Nelson Morris.[9] The former was the first to see that St.

[6] *The National Provisioner* (Feb. 9, 1901), Vol. XXIV, No. 6; *Ibid.* (July 5, 1902), Vol. XXVII, No. 1.
[7] *Ibid.* (May 14, 1898), Vol. XVIII, No. 20.
[8] *Ibid.* (Aug. 3, 1895), Vol. XII, No. 5.
[9] Winans, Evolution of a Vast Industry.

Joseph had the geographical location and that it had the country to draw from to make it a great packing center.

Donovan succeeded in interesting G. F. Swift, who looked over the situation, examining the qualities of soil, the transportation facilities, the type of farming population, and other matters. As a result, in July, 1896, the stockyards company was reorganized under the name of the St. Joseph Stockyards Company, and in January, 1897, Swift and Company became owners of the majority of the stock of the stockyards company. With the erection of a plant covering 19 acres by Swift and Company and another by Nelson Morris and Company, which bought a large block of the stockyard company stock, the rise of St. Joseph as a packing center was assured. "The advent of the packing industry, on a big scale meant the transformation of a city of sluggish life, dependent solely on its advantages as a wholesaling mercantile center, into a stirring, progressive city with a fast increasing population and vitality."

Omaha's Packing Beginnings

At Omaha, Nebraska, stockyards on a small scale were early established.[10] These were known as the "Bridge Yards" and the "Upper Yards." At first they were sufficient to handle the few cattle received, but in a short time the increase in the shipments of livestock to the city made necessary plans for more extensive yards. Thus as early as 1877 the livestock committee of the recently organized Omaha Board of Trade reported that it had been "impressed with the very generally expressed views of not only the business men of Omaha, but of the stock raisers and shippers themselves, north, south and west, of the importance and necessity of erecting and maintaining extensive stockyards and pickling and slaughtering houses in Omaha."

Omaha had built up what was thought at the beginning of 1879, to be a large business in pork packing. The leading

[10] *The National Provisioner* (Feb. 4, 1893), Vol. VII, No. 5.

packers were James E. Boyd, David Cook, and J. Phipps Roe. As time went on, Boyd became the most important packer, killing some 60,000 hogs a year. His chief competitors in the late seventies and early eighties were Harris and Fisher, and Joseph F. Sheely and Company. The Harris and Fisher plant employed from 20 to 50 men at an average wage of $1.50 to $3 a day (1878). It had a capacity of 400 cattle and 300 to 400 hogs a day. The firm packed some mess pork, but had more of a specialty in dry smoked and salt meats, beef curing, and canning.

The packing business in Omaha itself, however, was finally almost abandoned, there having been established such a competition nearby that it was futile to continue the business inside the boundary lines. In 1883 a practical turn was taken when men, most of whom were citizens of Omaha, evolved a plan for the laying out of a town, at or surrounding their industries, each to be an enterprise by itself, a distinct organization controlling its own affairs These men had studied for themselves the movement of livestock in the West and they reasoned in this way:

Omaha as a Livestock Center

> Omaha now is to Nebraska and the country beyond what Chicago was to Illinois and the great west when that city was the present size of Omaha. It is a natural law of trade that livestock will seek the nearest market, other things being equal. This will in a few years render Omaha one of the largest livestock centers in the United States.

A site was soon selected for the plant and a town. Simultaneously, two enterprising men had without each other's knowledge looked upon the open country south of Omaha and in 1884 there were built the stockyards and packinghouses and it was called South Omaha.

For a time after starting South Omaha there was only one packing firm in the place and unusual inducements had to be

offered to others to locate there. However, the newly formed Cudahy Packing Company whose founder, Michael Cudahy, had long been one of P. D. Armour's right-hand men, made Omaha its headquarters. This concern in August, 1892, was killing 44,772 hogs in a month, which is more than any one packinghouse in the world had killed in the same time.[11] The total killed in Omaha in that month was 120,448 hogs. In a short time the Cudahy company was erecting a range of car repair shops to facilitate the transportation of its products in its fast increasing business,[12] and by 1897 this firm was negotiating for ground in Youngstown, Ohio, and in many other places on which to erect refrigerators and storehouses.[13]

Following the Cudahy company, the G. H. Hammond Company went to South Omaha to erect a plant. Swift and Company built a plant in Omaha, and Armour and Company in 1897 decided to establish itself there also.[14] The coming to Omaha of these large packinghouses made possible the development of allied interests. The *Omaha Bee* stated that the packing plants were the forerunners of additional factories to work up the by-products, such as tanneries.[15] Such was the extraordinary growth of Omaha, a part of this westward movement of the large-scale packing industry. To quote the *South Omaha Daily Stockman,* in 1894, "ten years ago the history of South Omaha's stockyards interests was a blank. Today it stands as the third livestock market and packing center in the United States."

Sioux City and Meat Packing

Some distance northwest of Omaha, Sioux City, Iowa, began to assume some importance as a packing center. The first packinghouse in Sioux City was erected about 1875 by James E. Boage. It was some twelve years later, in the fall of

[11] *The National Provisioner* (Sept. 10, 1892), Vol. V, No. 24.
[12] *Ibid.* (Apr. 21, 1894), Vol. IX, No. 16.
[13] *Ibid.* (Jan. 23, 1897), Vol. XVI, No. 4.
[14] *Ibid.* (Aug. 21, 1897), Vol. XVII, No. 8.
[15] *Ibid.* (July 17, 1897).

1887, that the Union Stockyards opened, which by 1895 had received 606,380 cattle, 3,408,302 hogs, and 156,442 sheep, with a total value of $50,000,000.[16] In the nineties the larger packers began to consider Sioux City, and in 1892 the Cudahy Packing Company bought a packing plant from Edward Hutchinson and Company, which had formerly been under the control of the Union Stockyards Company. Michael Cudahy stated that he considered Sioux City one of the best stock markets in the country and he went there rather than to St. Joseph and St. Louis at that time, although offered large bonuses to go to the latter cities.[17] A few years later, in 1897, the Cudahy firm bought out the long abandoned plant of the Sioux City Dressed Beef and Canning Company, equipping it with the latest machinery at an expense of some $300,000. About the beginning of 1901 the Sioux City Provision Company was incorporated by Chicago capitalists to carry on the business of the International Packing Company at Sioux City.[18] Other of the larger packers, including Swift and Company, soon established plants at this point. In 1902 Armour and Company and Swift and Company, at the request of local interests, agreed to support the Sioux City stockyards, which were practically bankrupt, and to aid in developing the allied interests.[19]

Other Iowa Packing Points

Throughout Iowa there grew up many important smaller packers. For example, there was T. M. Sinclair and Company, at Cedar Rapids, established in 1871, Jacob E. Decker and Sons at Mason City, and John Morrell and Company, at Ottumwa. The founder of the Sinclair firm was Thomas M. Sinclair, who learned the pork business in Belfast, Ireland. Coming to New York he set up in business and forming a partnership with John Sinclair, developed a large trade. With

[16] *The National Provisioner* (Jan. 12, 1895), Vol. XI, No. 2.
[17] *Ibid.* (Dec. 3, 1892), Vol. VI, No. 11.
[18] *Ibid.* (Mar. 16, 1901), Vol. XXIV, No. 11.
[19] *Ibid.* (Oct. 18, 1902), Vol. XXVII, No. 16.

keen perception he saw that pork packing would eventually be a big industry in the West and about 1870 he located at Cedar Rapids in the heart of one of the finest hog raising regions in the world.[20]

The firm of John Morrell and Company contributes a very interesting chapter to the history of the meat-packing business. The foundation of the Morrell business was laid in Yorkshire, England, in the late twenties of the nineteenth century. The hams put up by this firm soon acquired an enviable reputation in the London market and later it became difficult to obtain sufficient hogs to meet the increasing demand, and in 1855 curing houses were established in Ireland.

In 1868 the attention of the company was directed to Canada, and inside of four years it was using the output of four packinghouses located in that country. Between the years 1871 and 1874 the Morrell packing business was concentrated in Chicago; but in the winter of 1877, investigation having demonstrated the excellent quality of the Corn Belt hogs, packing operations were begun at Ottumwa, Iowa. In 1888 the Chicago houses were closed and the company drew on the Ottumwa plant for all of its meats. Later, in 1911, the company completed and put into operation a new packing plant at Sioux Falls, South Dakota.

The advantages in the locations, such as those of the Morrell, Decker, and Sinclair establishments, are numerous, chief of which is the proximity of packing plants to the farm where the corn-fed hog is raised. As a consequence the hogs are not subjected to long, tiresome, and injurious railway journeys, just prior to being slaughtered.

St. Paul, Denver, and California

The growth of the foregoing meat packing centers has been followed at a later time in much the same way by many others into which it is impossible to go at length at this time.

[20] *Butchers' Advocate* (Dec. 7, 1892), Vol. XIV, No. 3.

Such was the experience at St. Paul in the middle nineties, and at Denver which became the headquarters for the American National Livestock Association. At both places it was found necessary to offer inducements to larger packing companies to establish plants there. More recently some packing companies have established plants on the Pacific Coast at Portland, Oregon, at San Francisco and other places in California, where the pioneer packers were Miller and Lux, the ranch kings who fought the eastern dressed beef.

In California and the Southwest, Los Angeles is apparently destined to become the center of the meat packing industry: (1) because it is becoming more and more surrounded by cotton fields, alfalfa pastures, and sugar beet plantations, which may be counted upon to furnish a steady supply of inexpensive and good feed; and (2) because it is the nearest common shipping point accessible to the large cattle and sheep ranges of the Southwest. For though cattle are slaughtered and sold by butchers in even the smallest towns, the chief marketing centers of this region, south of San Francisco and Ogden, and west of Denver are Los Angeles and Phoenix. There are other minor packing centers in the San Joaquin Valley and along the coast of southern California, but these are relatively unimportant, except for supplying local demands. Packing at Los Angeles is carried on by the Cudahy Packing Company and Wilson and Company, the Hauser Packing Company, the California Dressed Beef Company, the Standard Packing Company, and the Newmarket Company.[21] Later still was the development of Oklahoma City as a packing center, where in order to provide a permanent cash livestock market, the two large packers, Morris and Company and Sulzberger and Sons Company, had to subscribe for the majority of the stock.

[21] The "Cattle-raising Industry of the Southwest," issued by the Security Trust and Savings Bank, Los Angeles, Cal. This is an interesting and instructive original study prepared by C. C. Lincoln, Department of Research and Service (1921).

Texas Packing Growth

Further south in Texas there has been a great development in meat packing, lifting it from a local to a national level. For years now pork and beef packing had been carried on, but not until the last decade of the last century did it begin to grow as a part of the American packing industry. Among the companies which aided in this pioneer work was the Dallas Dressed Beef and Packing Company, which later became the Armstrong Packing Company, and the Fort Worth Packing Company, later bought by the Chicago Packing and Provision Company. Many of these were organized by eastern and Texan capitalists in the belief that it was necessary to have a home livestock market and packing houses in the greatest livestock state in the country. It was, however, only in 1902 that the larger packers, Swift and Armour, for example, established plants at Fort Worth and undertook to finance the stockyards in response to requests of that city. This brought the industry in Texas definitely in touch with the main national developments of meat packing.

In the last few years there has been going on a growth of meat packing in the southern states east and north of Texas, in the old South, e.g., Georgia, Tennessee, Alabama, and Florida. Swift and Company has a plant at Moultrie, Georgia, and Andalusia, Alabama, and Armour and Company at Jacksonville, Florida. There are also other local packers in these states who are doing a good business, such as the White Provision Company of Atlanta, Georgia.

CHAPTER XXI

MEAT CANNING AND WAR SERVICE

Discovery of Canning Process

Until the early part of the nineteenth century the only methods for preserving foods were drying, pickling, smoking, and preserving in sugar. The direct cause of the discovery of the efficacy of the hermetic sealing of foods to keep them in good condition was the Napoleonic War. About the end of the eighteenth century a prize was offered by the French government for the most practical method of preserving foods for sea service and military stores. As a result of this offer Nicholas Appert of Paris, a Frenchman, was stimulated to begin experimenting. After working on the problem from 1795 to 1809 he submitted to his government a treatise on the means of preserving foods and won the prize of 12,000 francs. The following year he published the results of his experiments.[1] Appert had had a wide experience for 50 years as pickler, preserver, brewer, distiller, and chef, and he so perfected the art of canning in glass that, according to experts, even now it is difficult to surpass his processes.

Appert's process consisted in enclosing the articles to be preserved in glass jars, which were then corked and exposed in open kettles to the action of boiling water for varying lengths of time, according to the nature of the article treated. While Appert had no conception of the rôle played by micro-organisms in the spoilage of foods, his experiments clearly showed that a vacuum alone was not sufficient for the preser-

[1] Powell, Ola, Successful Canning and Preserving, Chap. I, "History of the Development of Scientific Canning."

vation of foodstuffs, and that the application of heat and the subsequent exclusion of the outside air were essential to their successful preservation. It is now known that the air contains micro-organisms of germs which are responsible for the fermentation and putrefaction of foods.[2] At first the secret of the process was carefully guarded, but in time the employees of the different establishments became more or less familiar with the details of the process and in this way the method was carried, about 1815 or 1818, from England to America.

First Canning in America

Ezra Daggett is said to have brought the secret to America, and as early as 1819, in partnership with his son-in-law, Thomas Kensett, he was engaged in the packing of hermetically sealed foods in New York City. Lobster, salmon, and oysters were among the first goods packed in America, but by 1825 fruits and vegetables were also canned.

In the early days of the canning industry glass jars were employed, but owing to their bulkiness, cost, and easy breakage they were gradually abandoned for tin containers, which first came into use in 1825, when Thomas Kensett secured a patent on the use of tin cans in preserving foods. The cans were at first made entirely by hand, and their early manufacture was crude, costly, and tedious, the making of 100 cans being considered a good day's work. The introduction of labor-saving machinery, however, has greatly lessened the cost of production, and the manufacture of cans has become a distinct industry. Cans are now made entirely by machines, which cut the different parts and fit and solder them together, turning out the finished can with incredible rapidity. A single machine can now turn out as many as 90,000 cans a day.

While the canning industry was established on a commercial basis in this country as early as 1825, it has only been

[2] Yearbook Department of Agriculture (1911), "Commercial Methods of Canning Meats," by Dr. C. N. McBryde, Senior Bacteriologist, Biochemic Division, Bureau of Animal Industry, p. 38.

within the last 40 years that the industry has become one of much importance. At first there was considerable skepticism on the part of the public in regard to the healthfulness of canned goods, and a more or less widespread prejudice existed against their use. This prejudice has now largely disappeared, however, and the cost of production has been greatly lowered through the introduction of labor-saving machinery. Canned goods have now come into general use and meat canning as a part of the meat packing industry has achieved great economic importance.

During the Civil War in the United States large quantities of beef, preserved by methods similar to, if not identical with, those covered by the Appert patent, were used in the United States navy. Most, if not all, of this beef was put up in the cities of Portland, Maine, and Boston, Massachusetts, under patents issued to Hezekiah Winslow. Meats preserved in this way were placed in a raw state in cans, which were then put into vats and thoroughly cooked, the cans being sealed immediately after the cooking. Thus treated, the contents of the cans consisted of a considerable quantity of fluid in which the meat was suspended loosely. The flavor of the beef thus preserved was not very agreeable, as it seemed to have been scorched.

Chicago Meat Canning

On March 31, 1874, the business of putting up compressed cooked beef in tin cans of pyramidal form began in Chicago. The Wilson Packing Company was the first firm or corporation to pack compressed beef, so called, in cans of that shape. William J. Wilson, senior partner of the firm, introduced these goods into the New York market by carrying samples around in a basket and showing their merits to the trade. The business was very discouraging for a time, many not hesitating to say that Wilson was a lunatic. From that seemingly insignificant and unpromising beginning the trade in

canned meats has extended to the markets of every nation, and by 1884 it was evident that in the opinion of the people of all lands where such meats have been introduced they constitute a useful and economical food. At the beginning of the eighties Wilson retired with a considerable fortune.

The second firm to enter the business of packing compressed meats was that of Libby, McNeill and Libby, which began the business in January, 1875, having arranged with the Wilson Packing Company for joint rights and privileges under the patents issued to them by the United States Patent Office and believed fully to cover and protect all the processes employed in canning compressed meats. Next in order of those who entered the field was a corporation styled the St. Louis Beef Canning Company. It began packing meats by the processes described in the patents issued to the Wilson Packing Company and to Libby, McNeill and Libby. Suits were at once begun by the last named firms to restrain the St. Louis Beef Canning Company and others from using those processes in violation of the patents referred to, but the Supreme Court of the United States held that the patents in question were invalid.

Rapid Growth of Canning

During the ten years following the beginning of this canning the number of cases packed by these processes exceeded by several millions the total output of meats preserved by all other methods during the whole of the previous three-quarters of a century. That the consumer was benefited to a considerable extent by the change in the methods of packing was clearly apparent. The saving in cost resulting from the reduction in the amount of metal used, in the labor required, and in the cost of transportation of the metal, together with quantity of meat that could be put into the cans, was in the aggregate very large. One Chicago firm put up 35,775,663 cans of beef in one year. These cans were 1, 2, 4, 6, and 14 pounds

each. If all this meat had been put up in the old way with 25 to 35 per cent moisture, the consumer would have been called on to pay the freight on some 60,000,000 pounds of water. The chief gain to the consumer, however, was in the improved flavor of the meats preserved by the new processes.

From time to time after 1875 a number of firms entered the business, but retired from it in a few years. Some were unsuccessful while others retired for other reasons.[3] By 1880 American canned beef had taken the place of salt beef in ships stores and three years later the canning of beef had spread to Australia and New Zealand, which were shipping canned beef to European markets at lower prices. This was followed by Liebig, who was the pioneer of this business in South America at Montevideo, where he made his famous extract of beef. His process was adopted by American canned beef packers.[4]

Recent Canning of Meats

In 1910, out of the 795 establishments with federal inspection for the slaughter of livestock and manufacturing, only about 40 were engaged in the canning of meats;[5] because of the idea that canning only paid when done on a large scale. That idea was incorrect, however, as is shown by the considerable number of small canners in the United States who can meats, but do not slaughter livestock. They purchase their raw materials from the packers, operate almost the whole year around, and are prosperous.[6]

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[3] American Meat Canning Company, St. Louis, Missouri; The Denver Packing Company, Denver, Colorado; Omaha Packing Company, Omaha, Nebraska; Kingan and Company, Indianapolis, Indiana; Hannibal Meat Company, Hannibal, Missouri; Slavins, Ohern and Company, Kansas City, Missouri; Boston Beef Packing Company, Fulton, Texas; Chicago Packing and Provision Company, Chicago; Chicago Meat Company, Chicago; Ashwell and Company, Chicago; Anglo-American Packing and Provision Company, Chicago; and James Turner of Chicago. The firms which continued in business in the United States in the order in which they began: Libby, McNeill and Libby, Chicago; Plankinton and Armour, Milwaukee; Plankinton and Armour, Kansas City, Missouri; Lees, Hendricks Company, Chicago; Fairbanks Canning Company, Chicago.

[4] First Report Bureau of Animal Industry (1884), "Beef Canning," by Edward W. Perry, p. 262 *et seq.*

[5] Allen, John W., "Meat Canning," paper read at Convention of American Meat Packers' Association, 1910.

[6] See also Home Canning of Meats and Sea Food with Steam Pressure Canner, by Franz P. Lund, Specialist, Office of Extension Work in Agriculture and Home Economics, U. S. Department of Agriculture (1919); also *The National Provisioner* (Feb 20, 1909), Vol. XL, No. 8.

In the canning of meats the great variety in the products prepared renders necessary considerable variation in the methods employed, each product requiring a somewhat different treatment. Only a general description of the more important processes can be given here.

In the case of meats which are "processed," or heated in the can, it is customary to subject the meat to a preliminary cooking or parboiling before placing it in the cans. This is done in order partly to cook and at the same time to shrink the product. The cooking is carried on in large iron tanks, fitted with iron tops, used to cover the meat, and the water is heated by means of perforated steam coils in the bottom of the tank. When the meat has been sufficiently cooked it is removed from the boiling water by means of large metal forks and is transferred to the trimming bench, where the gristle, surplus fat, and bone are trimmed off. The meat then goes to the cutting machine, which cuts it to pieces, according to the size of the can to be filled. After it is cut to the proper size, the meat is passed down through a metal chute to a lower floor to be packed in the cans. Gravity is utilized as much as possible in handling the meats. The cooking is usually done at the top of the building, and the meat is then passed down from floor to floor, being subjected to the various manipulations of the canning process on its downward journey.

Speed and Cleanliness

In the plants of the large packers, the work in the canning rooms is largely done by girls, who become wonderfully quick and adept. They are furnished by the establishment with clean, washable uniforms, and present a neat and tidy appearance. Most of the larger plants also employ manicurists to care for the girls' hands and see that they are kept clean and sanitary.

In the case of corned beef and potted, or deviled meats, the cans are filled by machinery. The stuffing machines, which

usually work on the rotary principle, consist of a series of pistons and cylinders. The cans are placed beneath the cylinders, into which the meat is fed from above and is forced down into the cans by the pistons. When the can leaves the stuffing machine it is weighed and adjusted to the proper weight by adding to or taking out a little of the meat. After the can has been weighed and the necessary adjustment made in the weight, the cap is next put in place and soldered under a rotary soldering machine. The capping machines consist of a series of small revolving tables upon which the cans are placed, with the tops laid loosely in position. The caps are then clamped down from above, and are soldered, either by hand or by automatic soldering irons. When the cans leave the capping machine they have been completely sealed except for the small ventholes in the top, through which the air within the cans is to be later exhausted.

Care in Sealing Cans

The next step in the canning process consists in exhausting the air from the interior of the can. This is usually effected by means of vacuum machines, which consist of a large circular iron box with air-tight doors and a small glass window through which the vents are sealed by means of an electric soldering iron. The machine is filled with cans and closed, the vacuum then applied, and the vents are sealed as the cans are brought beneath the window on the movable bottom of the machine.

From the vacuum machine the cans are run out on tables and again inspected for leaks, after which they are ready to be processed. Processing consists in heating the cans to a sufficiently high temperature to insure the preserving of their contents, and constitutes one of the most important steps in the whole canning process. Two general methods of processing are followed, known as the "retort" process and the "water" process.

Processing Methods

In the retort method of processing, the cans are placed in large iron or steel boilers, known as "retorts," which can be securely closed by means of bolts. In these retorts the cans are subjected to the action of steam under pressure, and in this way high temperatures can be secured. The length of time the cans remain in the retorts and the temperatures employed depend upon the nature of the product and the size of the cans.

In the water method of processing, the cans are placed in large open kettles or tanks filled with water, which is raised to and maintained at the boiling temperature by means of steam pipes. The cans remain in the boiling water for varying lengths of time, depending upon the size of the can and the nature of the product.

After they have been processed, the cans are placed under a cold spray and allowed to remain until thoroughly chilled. When they leave the retorts or kettles in which they are heated, the ends of the cans are bulged outward owing to the expansion of the contents by the heat to which they have been subjected, but after they are chilled the ends of the cans draw in and present a slightly concave appearance. The cans are now subjected to another inspection, and any that are defective or leaky may be readily detected, as in these cans the ends remain bulged after chilling. The cans are next passed through a washing machine, which consists of a long iron tank fitted with a movable carrier, by means of which they are slowly passed through a hot solution of caustic soda. This is done to remove any fat or grease that may adhere to the cans, and is necessary in order that they may be subsequently painted. After passing through the soda solution the cans are washed with hot water in order to remove the alkali. After another inspection, the cans are ready for painting and labeling, which constitute the finishing touches whereby the cans are transformed into the attractive packages which are seen on the

shelves of the grocery stores. Both labeling and painting are mostly handwork. Machines have been devised, but do not seem to be altogether satisfactory.

Government Inspection

The canning of all meats at establishments which conduct interstate or foreign trade is carried on under the supervision of government meat inspectors, who watch the process from start to finish. The government inspectors are men who have had years of practical experience in the canning of meats, and have at their fingers' ends the detail of the various processes employed. These men not only watch the condition and quality of the meats that go into the cans, but are careful to see that the meats are handled in a cleanly and sanitary manner and that the methods of processing are adequate and thorough.

The proper methods of processing the various meat products have been carefully worked out and perfected by the different packing establishments. As a check on their methods of processing, however, most establishments maintain test or hot rooms, which are small rooms fitted with tiers of open-work metal shelves and maintained usually at a temperature of 100 to 110 degrees F. A sample batch of each run of canned goods is placed in the test room and kept there for a week or ten days, and if at the end of this time the cans show no signs of swelling the packer feels sure that his cans have been properly processed and that they will withstand even the summer temperature of a warm climate.

Embalmed Beef Episode

So far this study of the development of meat canning has been confined to normal peacetime progress, but "canned meat" or "tinned meat," as the phrase goes in England, has a wartime significance as well. In connection with the Spanish-American war, for example, there developed the so-called "embalmed beef" scandal, which aroused great comment both

in the United States and abroad, and which was distorted out of all proportion to its true significance by certain journalists. Since it was a matter of such public controversy at that time, it is worth while to consider briefly the real circumstances of the case.

First, it is well to recall the fact that every war has its scandals, many of them like that of the war of 1898. For example, General Sherman wrote in April, 1863, when his army was before Vicksburg:

> If the newspapers will only discuss matters within their knowledge parents would not be kept frantic with accounts of sickness and death. . . . . We have hundreds of visitors daily because correspondents represented us all as dying when the truth is no army was ever better provided for or supplied.

During the Spanish-American war there were two different sorts of meat rations—dressed beef and canned meat. It was with regard to the first that the phrase "embalmed beef" arose. Apparently it was first used by Major General Nelson A. Miles, who commanded in Porto Rico, in a statement before the War Investigating Committee to the effect that:

> In my judgment there is some serious defect in that refrigerator beef and also the canned beef that was furnished. There was sent what is known as or called refrigerated beef which you might call embalmed beef.

With the outbreak of war there came a sudden and unprecedented demand for meat products. Before that, indeed, by March 26, 10,000,000 pounds of various kinds of canned meats had been ordered by the government in addition to the regular supplies. Many American packing and canning companies were filling orders, among them Libby, McNeill and Libby, Armour and Company, the International and Wells Packing Company, the Jacob Dold Packing Company, the G. H. Hammond Company, and Morris and Company. Such great amounts of meat products could not be specially prepared for the purpose and had to be taken from the available

stock on the market, which had been for years a recognized wholesome food. As for the refrigerated beef any process—even if the packers had felt disposed to pursue such a plan, in view of the perfection of refrigerating methods which were employed—would have been so easily subject to detection that the idea was ridiculous, especially as every piece of meat was inspected.

Packers Not to Blame

This was the conclusion of two special investigations appointed by President McKinley, namely, the War Investigating Committee and the Court of Inquiry. The latter found it impossible to locate any great quantity of defective cans, and careful inspection indicated no unusual loss from deterioration in quality or defective packing. This court went further, indeed, and stated that no report of bad canned roast beef had been made until December 21, 1898, when General Miles, who was in command, made the statement quoted above before the commission appointed to investigate the war with Spain; that regarding canned beef no neglect on the part of the army officers was found; but that as for refrigerated beef there was neglect in the time taken in delivery to the troops, when wagons were often not clean, and there was no protection from the sun and rain. As a result the troops had suffered much. There was failure as to system and the fault rested with the brigade and higher commissary officers.

This verdict of the court was a complete vindication of the meat packers of the country, but the incident had a bad effect upon the export trade. During the fiscal year 1897, the United States exported meats, live and dressed, to the value of $125,000,000. In 1898 that trade increased to $156,000,000, but for the next few years the trade was very greatly cut down.

Yet foreign governments continued to get supplies from the American meat packers. During the South African War the British government contracted in the United States for

canned meats for the troops. Orders were placed in Chicago, Louisville, and Kansas City, to be shipped to Cape Town. In 1900 the Boxer trouble in China caused a great demand for canned meat.[7] During the Russo-Japanese War the same thing happened. Finally, the American canned beef or meats regained complete supremacy. In 1909 the British War Office closed 3-year contracts with a large packer in Chicago for 7 to 10 million pounds of canned beef. After full investigation, these contracts were awarded to the firm in Chicago in the face of Argentine and Australian competition.[8]

Packers and the World War

It was during the great European War of 1914–1918, however, that the meat packing industry made its most remarkable achievement.[9] In the first five months of 1918 the United States exported a billion and a half pounds of meat—fresh, cured, and canned. The monthly average of beef exports for the three years preceding the war was 1,066,000 pounds. In June, 1918, however, the beef exports were 92,173,000 pounds. For the three years before the war the monthly average of pork products was 41,500,000 pounds, whereas in June, 1918, they were 169,300,000 pounds.

The war needs brought problems in manufacturing of canned and cured meats which were stupendous. Speed made necessary wherever possible the substitution of machine work for hand operations. Power band saws did the work of the old handsaws at greatly increased efficiency. Whittling disc knives cut the meat into strips and squares.

The center of activity was Chicago, although many meat packers throughout the country were busy also. In the Chicago plants, 1,500,000 pounds of boneless meat went into cars every day. In one canning plant, 5,000 people were employed

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[7] *The National Provisioner* (July 28, 1906), Vol. XXXV, No. 4.
[8] *The National Provisioner* (Feb. 27, 1909), Vol. XL, No. 9.
[9] *McClure's Magazine*, Dec., 1918, "Packing for Pershing," by Edward Mott Woolley.

and 2,000 cattle a day went into various sorts of canned goods. In a sense the meat canning industry became necessarily a war industry. The increase in the number of workers was from 100 to 200 per cent in a year, while the production itself, as a result of intensive mechanical methods, went up in much greater ratio. As Edward Mott Woolley has stated in an interesting article, "perhaps no other industry has witnessed such a concentration of machines, appliances and workers in the same number of square feet."

It is impossible to enter into a detailed description here, but a few things may be noted to give some indication of the scope of operations necessary.

Making Corned Beef Hash

One of the most popular products was corned beef hash, whose production increased 800 per cent in one year, one company making 180,000 pounds of it a day. In this department were long tables aggregating hundreds of feet in length, at which scores of women, gowned and capped, standing close in line, were peeling boiled potatoes with great speed. On one side of the great room was a battery of power choppers. From these choppers the hash went to the stuffing rooms, where automatic machines put it into cans, a single machine filling 20,000 2-pound cans a day. Every operation was automatic, the pace bewildering. One army order called for 25,000,000 cans.

The so-called "kitchens" of the larger packing plants have, as Mr. Woolley has stated, literally acres of enormous cooking tanks in which are boiling hundreds of tons of meats, which are stirred mechanically and lifted by air hoists. This meat when cooked is carried by hanging railroads to chutes, down which it passes by gravity to the different departments. The vast soup kitchens are filled with caldrons in which are being prepared tomato, chicken, mock turtle, mulligatawny, and vegetable soups.

During the war so far as possible the special tastes of the different allied armies, American, English, French, and Italian, were filled by the canning and curing departments. For the French army there were huge amounts of special boiled beef shipped. This was highly seasoned with pepper, salt, allspice, and such things. The name given to this was *boeuf assaisonne,* and it required a special canning room. A great deal of this was prepared in South American plants. On the other hand, the British army took immense quantities of corned beef, although all the armies, except the Italian, liked it. As a result the production increased 300 per cent in one year. One order alone called for 50,000,000 12-ounce cans. The Italians took instead of corned beef a large amount of boiled beef. The French and Italians were fond of special cuts of cured pork, largely fat, while the Anglo-Americans' tastes ran in the other direction. A favorite canned product with the English and Belgians was known as "rations," comprising one-third beef and two-thirds vegetables.

War Meat Problems

From these brief statements some idea can be gained of the great problems of production, but the biggest problems were to get the products through to the Atlantic ports on time, and to get the dressed and canned and cured meats loaded on the steamships without delay and deterioration. This was most difficult, for ships often arrived without advance notice because of the danger of sending wireless messages. The instant that a ship came in, therefore, the machinery of the whole distribution system of the packing industry began to function with extraordinary speed. It was in preparation for just such emergencies that immense supplies of meat and meat products were kept in reserve in the refrigerator rooms. In its curing cellars one big concern averaged 100,000,000 pounds of meats in various stages of preparation.

Speedy Meat Distribution

The importance of having a well-articulated national system of distribution was clearly shown. When one of these rush orders came, hundreds of men were shifted from other departments and set to work handling and loading the products required. In filling one rush order a Chicago packing company in one week shipped 1,000 carloads, two-thirds for the allied nations, which amounted altogether to some 32,000,000 pounds of meat products. Of these, 20,000,000 pounds were fresh and frozen beef cuts, 8,000,000 pounds of cured pork products, bacon and ham, 350,000 pounds of lard and oils, 730,000 pounds of other products. The same company averaged weekly shipments of 20,000,000 to 25,000,000 pounds, and on one occasion, when it was necessary to utilize steamer space in a hurry, 24,000,000 pounds of meats and fats were shipped from Chicago on three days' notice.

To fill such orders required the most vigorous mobilization for war. It is only in considering the details to be looked to in reaching the final satisfactory results that one realizes just what it involved. Some of the chief details can be summarized as follows:

1. Departments and machinery and tools had to be kept clean, sanitary, and in good repair; for highest efficiency also the workmen had to be neat and clean.
2. Temperatures had to be watched carefully and the various degrees for the different departments strictly adhered to.
3. Proper inspections, and in many cases special chemical analyses had to be made to keep each separate product up to the required standard.
4. Products had to be carefully weighed, check-weighed, and packed.
5. Age limits had to be closely followed so that the consuming trade received fresh and properly cured products at all times.

6. Loading and icing of cars for the perishable products had to be followed very carefully and the icing of cars followed through to destination so as to insure good condition on delivery.

Other Service of Packers

It is curious that the general public did not realize the real scope of the work that the packers were doing to help win the war. Most people knew, of course, that the packers furnished meat and meat food products, but not one in a hundred had any idea that the packing industry went further than that. For example, the industry furnished a great deal of material for the manufacture of munitions including glycerin, potash, and sulphuric acid. Besides this, sheep skins were used to manufacture cold-proof coats. Every pound of wool was taken by the government as fast as the packers could produce it, and at a price fixed by the government. All the stock food made by the packers went to put weight on livestock which were later food for the troops. The tons of fertilizer which the packers turned out aided in the growing of more crops. Glue also had its uses. Soap was a big item. Albumen was another highly important product used in the construction of aeroplanes. These were but a few of the ways in which the packing industry did remarkably important war service.

Many anomalous administrative problems were brought by the war. Before any foreign shipment could be made a long list of documents had to be executed, including invoices, certificates of the Bureau of Animal Industry, weight slips, bills of lading, consular invoices, and the OK's of inspectors of various countries. When the large orders were rushed through to meet sailing schedules, it was necessary to have the office force able to keep pace. New methods had to be worked out, schools for training office forces were established, and the offices were specially equipped with every kind of labor-saving

machinery, such as calculating, duplicating, and bookkeeping machines. Even with this equipment some offices had to double space and force and some even had special night office forces. By means of private wires operated between New York, Boston, Philadelphia, Washington, Baltimore, Cleveland, Milwaukee, St. Louis, Omaha, Kansas City, St. Paul, and other points, such speed was possible that within 36 minutes after a certain big order for army meat was received, it had been divided among the various branches and instructions flashed to each of them.

Packer Service in France

The meat packing industry's contribution did not cease with the shipping of meat products from America. It was employees of the meat packing industry, as was stated in *Le Matin,* who constructed the huge army refrigerating plant in central France. That plant covered several acres and had a capacity of 10,400,000 pounds of meat, which is the equivalent of 15,000 head of cattle weighing an average of 700 pounds apiece. In addition to the necessary plant refrigeration it had facilities to turn out daily 500 additional tons of ice for icing refrigerator cars. The Parisian paper declared this a most striking and characteristic example of American genius and energy. In this the American packing industry was the means of proof of Napoleon's famous dictum regarding the winning of a war, "An army travels on its stomach."